

VOL. XXIX. No. 4

APRIL 1944

MECCANO MAGAZINE



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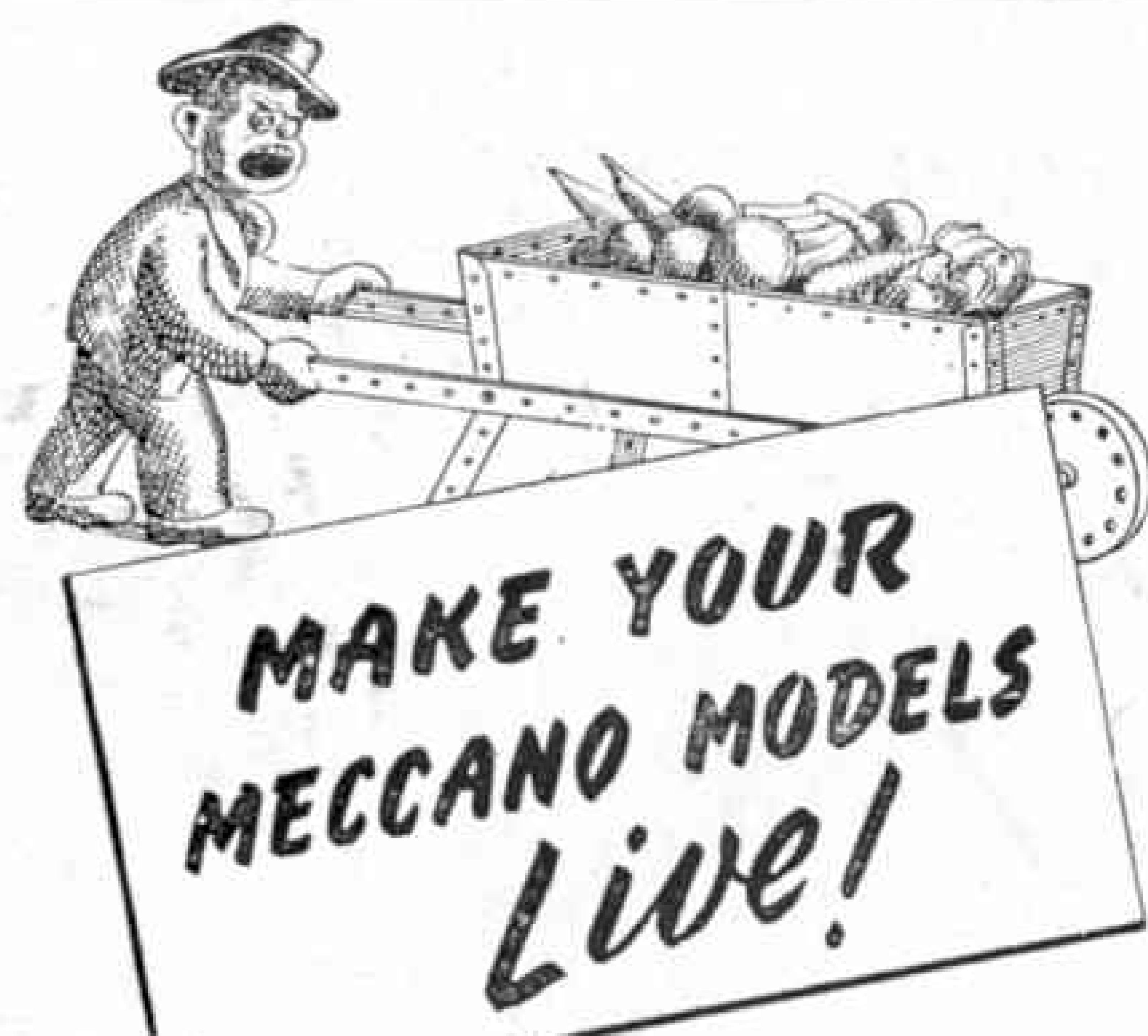
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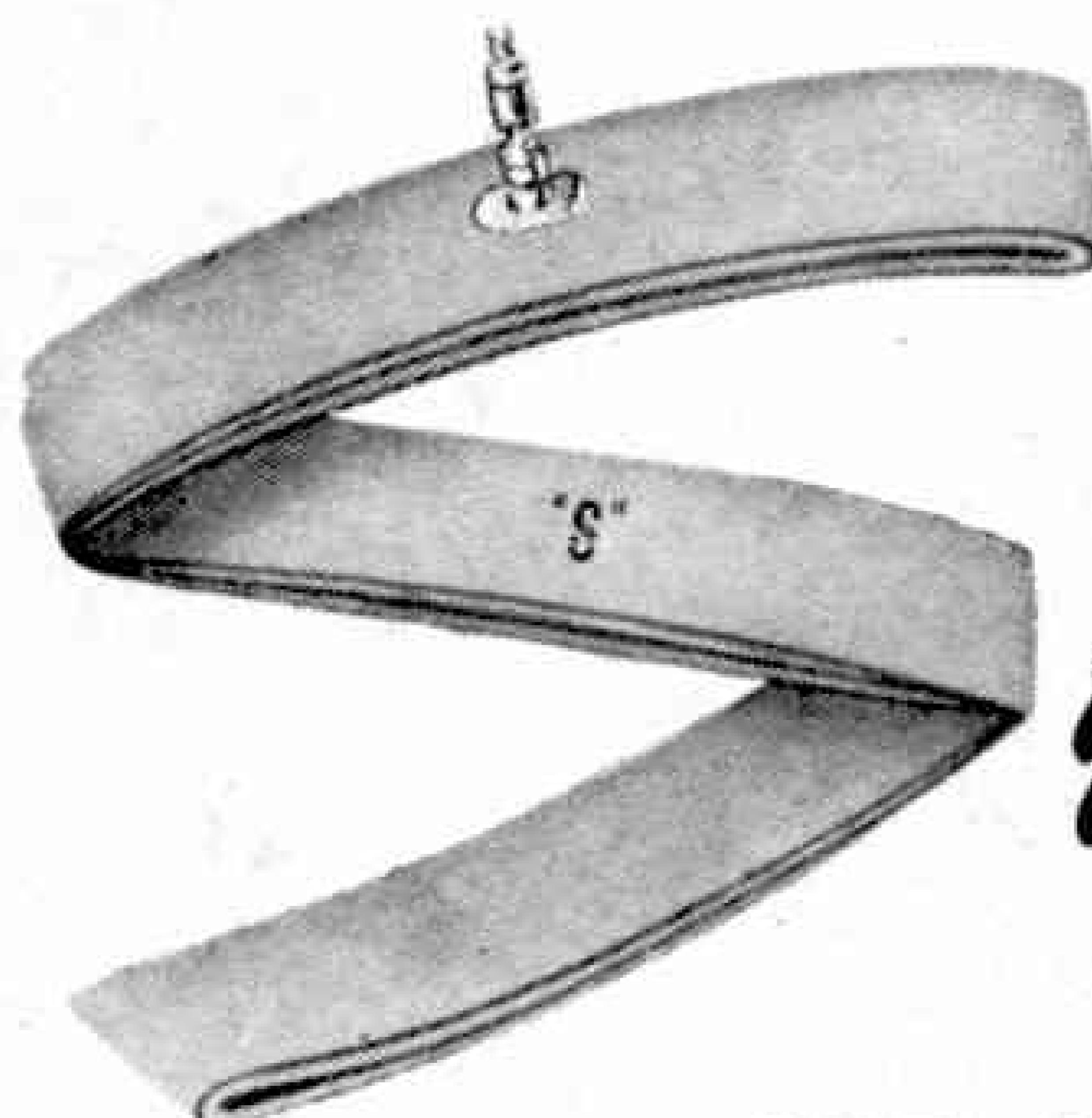
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
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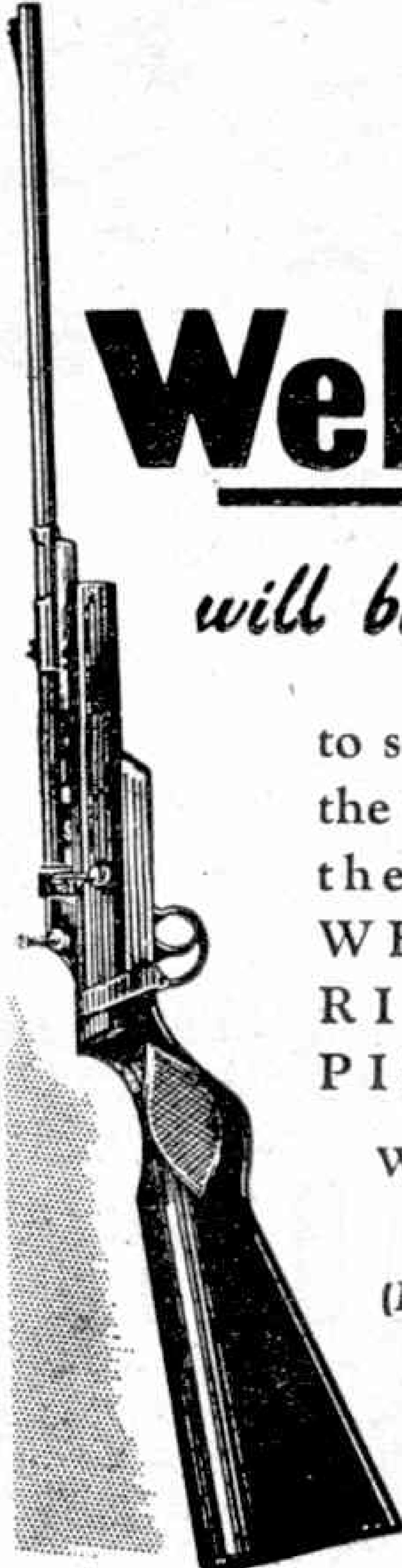


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THANK YOU, BOYS & GIRLS!

Now that our story "The Spy-clists" has come to an end we at B.S.A. would like to say thank you—thank you to you all.

We have been quite overwhelmed by the interest you've taken in the B.S.A. Missing Word Competitions and by the large number of entries. We like to think that Michael and Monica are a boy and girl just after your own heart—observant, courageous, and unbeatable—on their B.S.A. cycles.

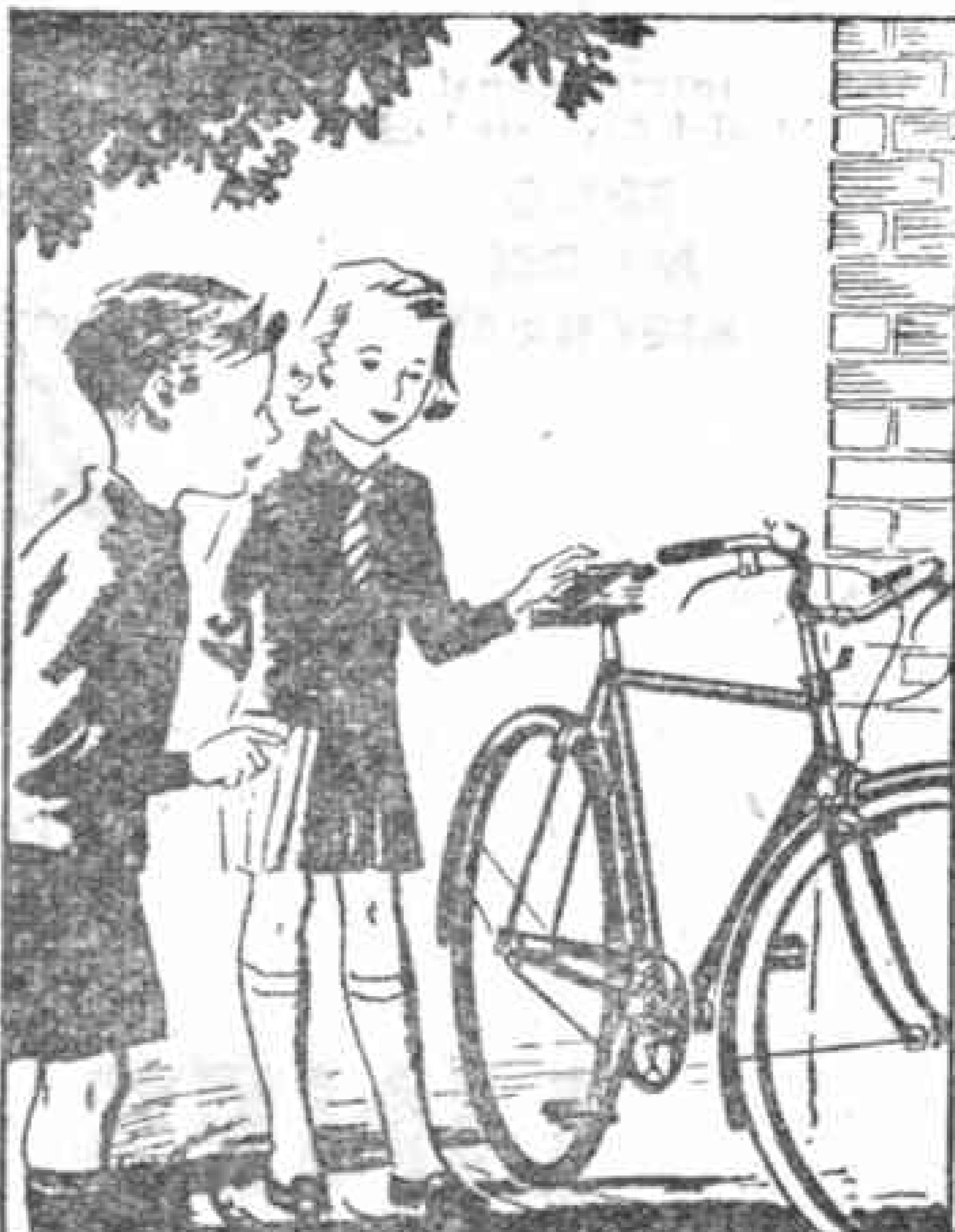
The winners have had their reward in hard cash, but we hope that you boys and girls who did not reach the goal will accept our friendship all the same.

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Next Month: "HOW U BOATS ARE HUNTED." By Capt. B. Acworth, D.S.O.

MECCANO MAGAZINE

Editorial Office:
Binns Road
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England

Vol. XXIX
No. 4
April 1944

With the Editor

The Toy Famine

The toy famine produced by wartime conditions has resulted in many boxes of Meccano parts being dragged forth from dark places where they had lain forgotten for years, and in a most remarkable revival of "Meccano fever" among grown-ups. I have had letters from fathers, uncles, and even grandfathers, recalling their youthful enthusiasm for model-building, and the devious ways in which they extracted coppers from unwilling parents to buy the few parts needed to complete their latest bridge or crane.

A Happy Meccano Family

One particularly interesting letter comes from a lady who was in search of certain instruction manuals. I was able to help her, and this is how she replied:

"I am specially pleased at being able to obtain these manuals, as I have almost forgotten the tough and bullying instructions in Meccano building I received from my brothers as a girl. My eldest brother is now M.I.M.E. and M.I.E.E., and has aeronautical qualifications too. He is a senior designer in an aircraft factory. All his early mechanical knowledge was learnt from Meccano, and all our pooled pocket-money went to a dealer in a neighbouring town for additional parts. As the only girl in the family, my small pittance was forcibly pooled, and my highest honour was to pedal the sewing machine (treadle type) to which the models were attached. We were years before we could ever afford a motor. Your Meccano gave us some of the happiest hours of our youth and was the foundation of much knowledge."

I think this is a wonderfully pleasant picture of a happy Meccano family.

The War on Japan

The war against Japan is taking place so very far away and over such a vast area that we are apt to be rather hazy in our minds about its real nature. When the German menace has been smashed we shall have to turn our attention in real earnest to helping the United States to crush Japan, and in the meantime we should try to understand what this war will involve.

I have therefore arranged for two articles under the heading "How to Beat Japan." In the first, in next month's issue, Mr. C. G. Grey will give his candid opinion of the Japanese, and explain why he thinks the war will be won by air. In the second, in June, Captain Bernard Acworth will show why he thinks it will be a "Sea Affair."

Do not miss these fine articles.

This Month's Special Articles

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Naval Power in the Great Invasion

By Capt. Bernard Acworth, D.S.O., R.N. (Retd.)

AFTER nearly four years of preparation the whole nation, and the world, await on tip-toe the invasion of the "European Fortress." Hitler also awaits it, and we may therefore be sure that the struggle will be fierce and the outcome tremendous in its consequences.

There is no parallel in military history to this tremendous enterprise. Many large-scale invasions have been undertaken in the past, but none by such large forces as are contemplated, or in the face of so great preparation by an enemy. The public discussion of this great invasion on both sides of the water is itself unprecedented, but the chief feature which makes it so awe-inspiring is the multiplicity and destructive power of the engines of war that will be employed on both sides.

Our chief advantage lies in the element of surprise, because in the case of seaborne attack the enemy cannot know with certainty where the landing will be attempted, or, if several are made, which is the one that means business and which are diversionary. But owing to the necessity of giving the invasion fleets and armies "fighter cover," and because suitable landing beaches are rare, this element of surprise is limited. In all other respects the natural advantages lie with the defenders. This is clear when we consider the almost staggering amount of tonnage needed to transport and supply the invasion armies; the inevitable congestion of this tonnage near the invasion points, the speed with which the defending armies can be reinforced and supplied from the enemy's reserve centres, and the always uncertain factor of the weather, which affects the

invaders greatly and the defenders hardly at all.

Turning from strategical considerations to material ones, let us see what are the chief engines of war that will play their deadly part in this struggle of Titans in the three elements—Land, Air, Sea.

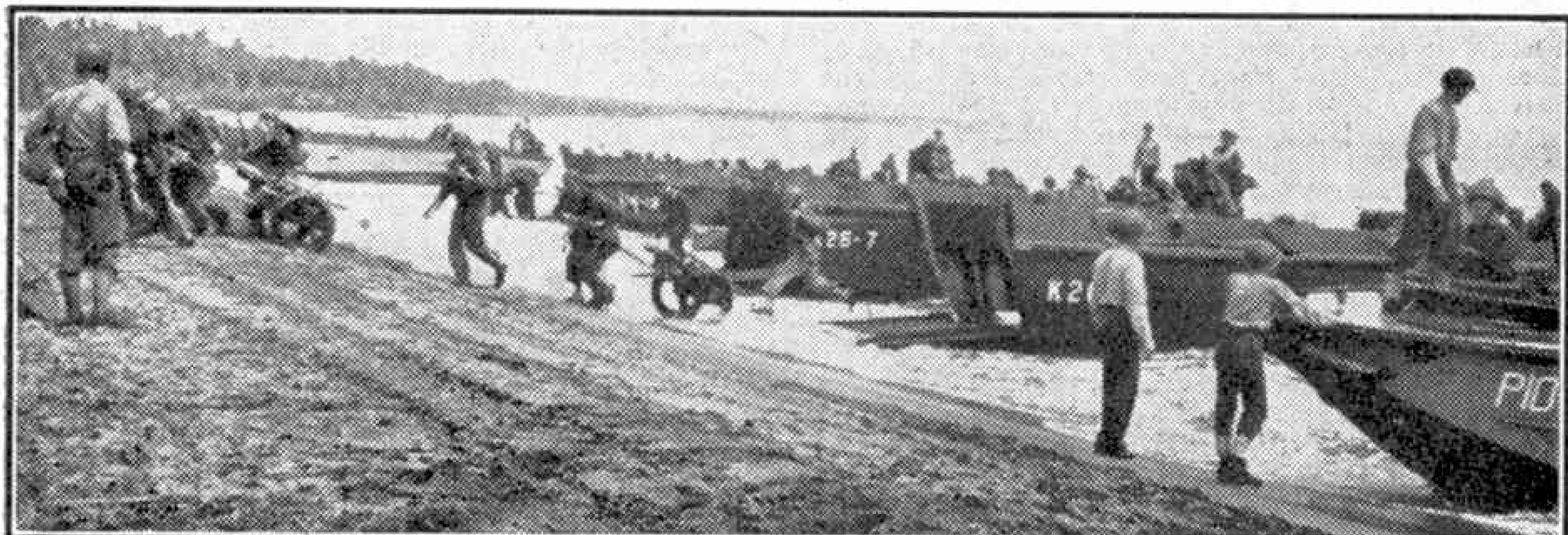
On land, we must credit the enemy with sufficient foresight to have established the heaviest of artillery in well guarded sites at all the practicable invasion points. These guns will be for engaging our warships and transports at sea. Remember that naval guns are at a great disadvantage against shore guns for reasons which are too obvious to need enumerating. Remember the Dardanelles in the last war, and Dakar in this one. Light artillery will be massed for the attack on the landing craft, crowded to capacity with soldiers. As our soldiers leap, perhaps waist-deep, into the sea to storm the beaches, an enemy hail from concealed machine guns must be expected. The invaders' answer to all this artillery preparation (in the absence of surprise) must be

from the great guns of the British Navy and from the bombs of our vast air fleets. But, as I have said, in such a duel land guns have the overwhelming advantage.

In the air, there is no need to emphasise the immense superiority upon which we are relying; but it is well to remember that the relatively poor showing of the Luftwaffe in recent months may partly be accounted for by the nursing of their bombers for this very occasion, and there is no denying that a vast concourse of ships, mostly stationary, is a better and more fruitful target than guns and troops on land in concealed emplacements. In



Admiral Sir Bertram Ramsay, Allied Second Front Naval Commander-in-Chief.



U.S. Marines unloading guns and equipment for the attack on Guadalcanal Island.

this connection, remember Cassino, and the Nettuno Bridgehead.

On the sea we shall have the massed might of Anglo-American sea-power to oppose the German sea-power which, in heavy ships and destroyers, is relatively insignificant, but which in U-boats, E boats, and other small craft may well resemble a swarm of stinging fish. Added to the guns of all calibres, ranging from 16 in. to 4 in., and to the swarms of torpedoes, depth charges and bombs carried in the ships and aircraft, will be mines of every kind—contact, magnetic and acoustic.

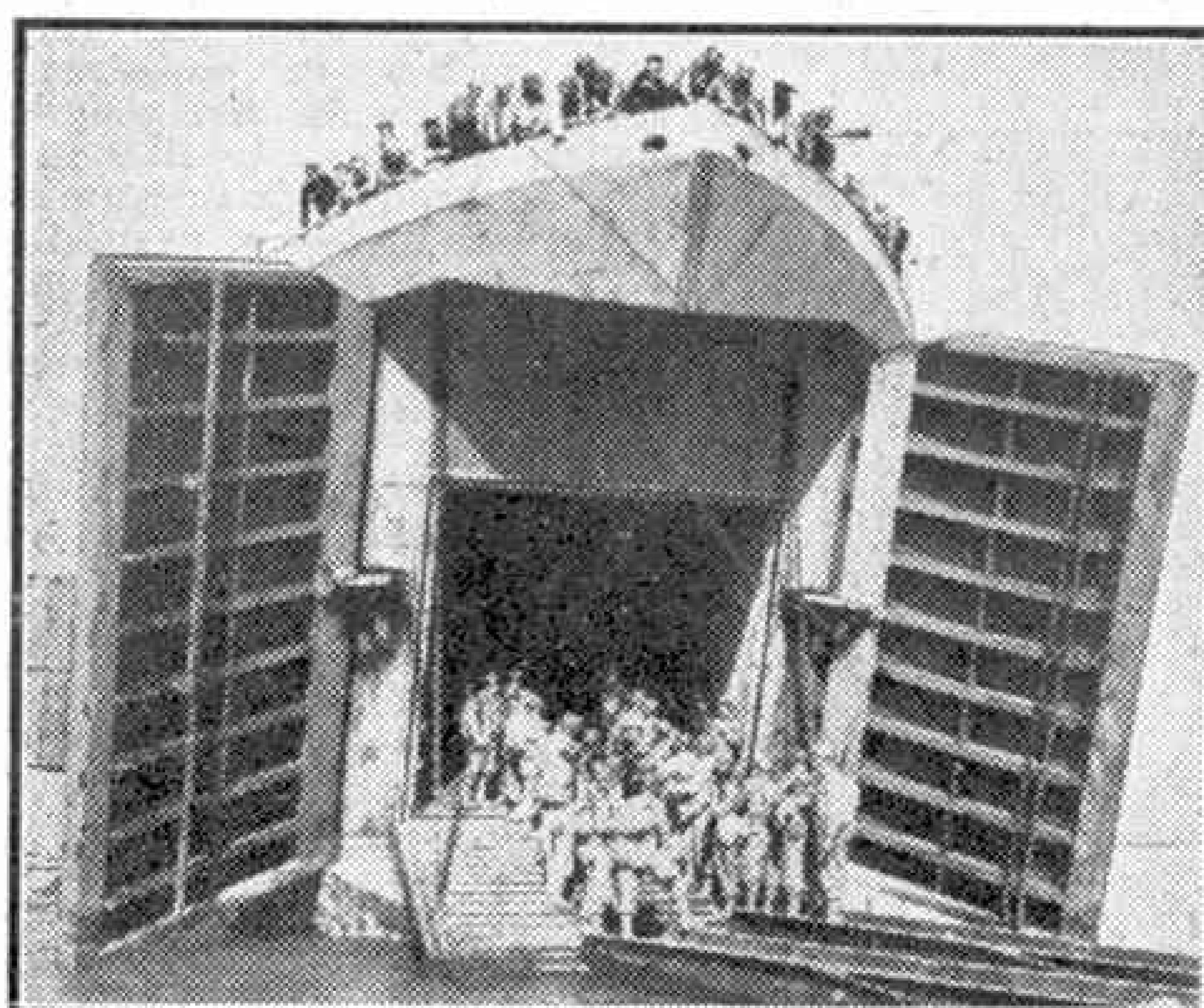
That the death-dealing weapons here enumerated will be massed on both sides we are safe in assuming. What new "secret weapons" are concealed in the lockers of both sides we do not yet know. These "secret weapons" may be fictional

to attackers and attacked, let us now try to picture to ourselves the tactical or operational side of this mighty and awe-inspiring adventure. Such a picture must inevitably be what modern painters would call "futuristic"; that is to say suggestive rather than detailed, because only those responsible for planning this huge operation can know its details.

There are three distinct aspects of the naval side of the invasion to be considered—the enemy's plans, our plans, and the final clash of these two plans when set in motion. The Germans, we may be sure, are fully alive to the enormous target that an armada of ships presents to bombers and land artillery. We shall therefore assume that immense air fleets, centrally located, will be in readiness for *Der Tag*. Guns of every calibre, and their crews, will be ready "on a split yarn" to blaze away at the Armada, as it looms over the horizon and draws shoreward. U-boats, recalled from their oceanic warfare, will be at the ready, either in the most convenient harbours or on their allotted patrols. So with flotillas of small surface craft and, we should expect, the remnants of the German heavy ships, which are still not negligible. We must also expect the sea-approaches to be as thickly mined as the land over which the German armies retreat.

The Allied plans will be on a vaster scale, not only because the invaders need a great preponderance over the invaded to ensure success, but because in every type of ship and material (except submarines) we have overwhelming superiority.

Only those directing the plans for invasion know its scale, but some idea of the shipping of all kinds required can be gained from the statement that little short of 3,000 ships and landing craft were employed in establishing the relatively



Monster landing craft opens its jaws.

for propaganda purposes. On the other hand they may not be.

Having touched upon the strategical aspects of invasion, and having considered shortly the material that will be available

insignificant Nettuno Beachhead. Without attempting any exact estimates, I shall be safe in saying, that millions of tons of shipping, and many thousands of ships, of all sorts, sizes and shapes, will, on the fateful day, nose their way towards the death-dealing reception that Hitler has prepared, and is still preparing for them.

Every ship, every landing craft, will be loaded in the reverse order to that needed for unloading on the beaches and in the port, or ports, which it will, presumably, be the first objective of the first Divisions ashore to seize from the land. Without deep-water jetties and cranes the bulk of the heavy equipment could not be landed without fatal delay. When we remember that the Germans can be relied upon to "scorch" the whole countryside and towns in their wake, some idea may be formed of the sheer bulk of food, water and other necessities for an army of hundreds of thousands that cannot "live on the country" which it is invading. All this commissariat is apart from the tanks, guns, and other equipment.

So much for the preparation on either side of the water. Let us now place ourselves, in imagination, in one of the small warships escorting the armada as it puts to sea from many English ports at times which will enable it, and the smaller diversionary fleets, to assemble off the selected invasion points at the crack of dawn and, presumably, at high water. The state of the tide and moon are likely to be factors which govern the date of the enterprise, and which therefore tend to reduce the important factor of surprise.

Leaving some British harbour in the dark hours on the flank of this portion of the invasion fleet, we may see little but the shadowy forms of the ships which form it. But as dawn begins to lighten the Eastern sky, the dim shapes of other contingents of the armada will be sighted hull-down on the horizon, all on courses converging towards the invasion beaches. Wide on the flank, scurrying hither and thither, we shall see hundreds of small craft—destroyers, frigates, corvettes and M.T.B.s—on the alert for enemy E boats and for the periscopes of U boats which, we must expect, will now soon be sighted, if indeed they have not already exposed themselves in surface pack-attacks before dawn.

Ahead of each converging contingent of the armada will be lines of minesweepers equipped for dealing with mines of all kinds. It is likely that the first indications of the coming storm will be explosions ahead of the on-coming trooperships, storeships and landing craft, as mines in the armada's course are exploded harmlessly by the minesweepers. At the first crack of dawn enemy scouting planes, harbingers of an amphibious armageddon, will have been sighted overhead, and the air-battles with these "eyes" of the German defenders are likely to be the beginning of the war above the fleets.

But these preliminary signs of action—U boat attacks, exploding mines and scouting

air-battles—will be short-lived because at daybreak the whole armada may be expected to have reached its appointed locality, off the invasion beaches, from where the beach-storming, at zero hour, will start. At this point in the grim operations, and far out at sea, an Allied battlefleet may well be sighted hull-



Assault troops coming ashore with bulldozers, lorries, and other material from a tank landing craft.

down, or its presence disclosed by the deep roar and flashes of its 16 in. guns from invisible ships, as they pour salvo after salvo on to the German land defences.

With the break of day, and the arrival of every part of the invasion fleet at its pre-arranged place at the pre-arranged minute, we are justified in expecting to see, from our vantage point, pandemonium let loose. Every ship, from battleship to M.T.B.s, will be ablaze and rocking with gunfire, either against the beaches or against the enemy's small craft of every type. Overhead the battle will rage between fleets of opposing bombers and fighters. Amidst this hell-let-loose tens of thousands of soldiers will be streaming over the sides of transports and heading for the beaches.

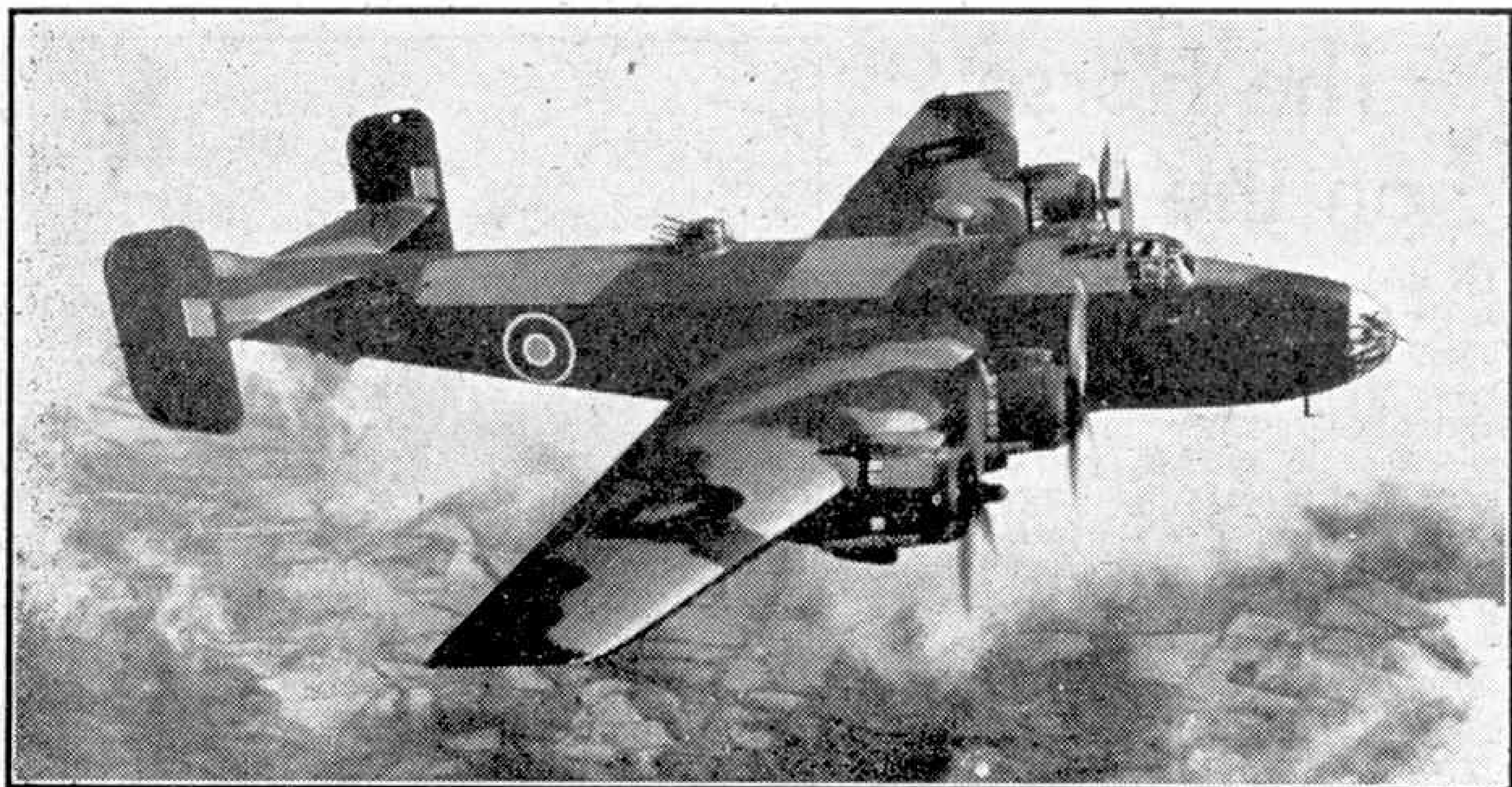
But here I conclude with a word of caution. This lurid picture pre-supposes that the enemy is ready for our invasion in a locality which he has correctly foreseen. This, we must hope, will not be so. Alternatively, he may deliberately allow us, with

little preliminary opposition except by bombs and gunfire against our ships, to establish a bridge-head on the Nettuno model with a view, so to speak, of absorbing and holding our invading armies on land while maintaining a ceaseless attack by every means in his power against the vast fleets that will be ceaselessly required off-shore for their supply and reinforcement. If this is his plan, as it well may be, the picture I have tried to draw of an amphibious armageddon will need modification on the lines of less intensity, but of far greater duration.

But of this we may be sure, Hitler, like the Allies, intends that our "Second Front" shall be the final climax of the war. Whatever, therefore betides, the battle's on, over and under the sea for the army's support will be fierce and sustained and, in their general nature, on the lines I have indicated.



Admiral Sir Bruce Fraser, Second Front Commander-in-Chief of the Home Fleet.



The Handley Page "Halifax" III

By C. G. Grey

(*Founder of "The Aeroplane," 1911, Editor until September, 1939*)

HANDLEY PAGE LTD. started, many months ago, to find how they could make their earlier types of "Halifax" better than any other big bomber in the world. There has always been keen but friendly rivalry between A. V. Roe and Co. Ltd., who make the "Lancaster," and Handley Page Ltd. Each, in turn, has made alterations which have increased the bomb load or the performance of their machine, so that they have stepped up and up, keeping ahead of the best big bombers made by any other nation, including our Allies.

H.P.'s did their last revision very cleverly. They took one of their standard bombers and stripped it of everything that stuck out. They took off the top turret and the radio mast, and they plastered over every crack and cranny into, or out of, which air could leak. In fact, they stripped and faired everything off, just as if they were entering the great machine for a race, which in fact they were—a race with the German defences.

They then timed the machine high up and low down till they knew exactly what its best performance was. Then they began putting things back. They put a four-gun turret on top instead of a two-gun turret, but a turret of a new type which offered less resistance. They altered the nose and put one hand-operated gun in it, just in

case a Hun did get right in the way of the machine. In any other position he would be covered by the turret on top or the turret in the tail. And they altered the shape of other things.

After each alteration the machine was tested again to see what difference it made. Alterations were made in the alteration to improve it.

Then another alteration would be made, followed by the same routine. So gradually they got back all the armament they wanted, and radio outfit, and bomb doors, and new nose and all. The rise in speed was astonishing, so was the rise in climb with full load.

But more difference than anything was made by fitting four Bristol "Hercules" engines, each of more than 1,650 h.p., instead of four "Merlins," of about 1,150 h.p. Thus four "Hercules" engines was the equivalent of five of the older engines.

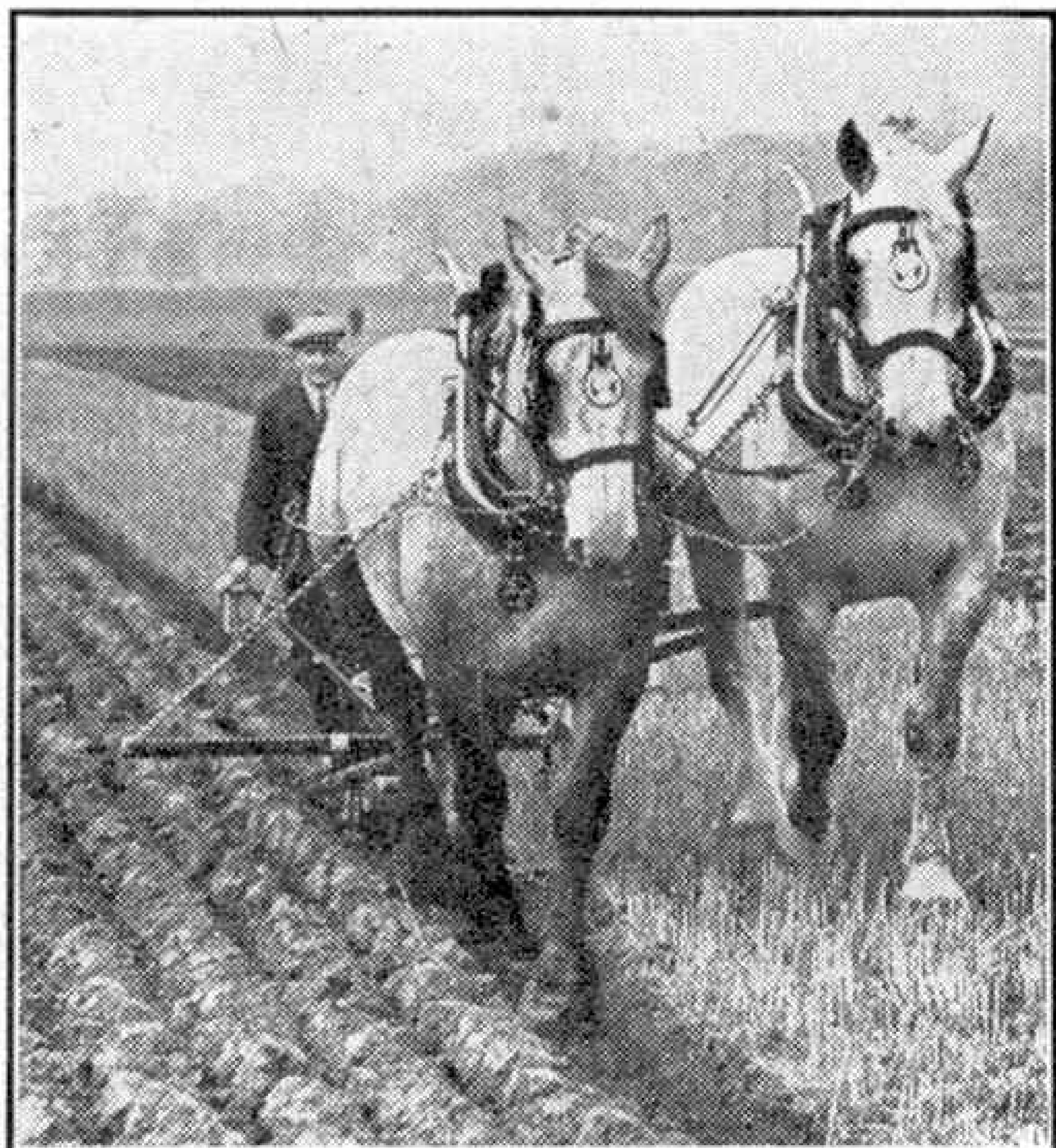
The result has been that Handley Page Ltd. now claim that the "Halifax" III is faster flying level, climbs faster, carries a bigger load, gets off more quickly, and lands with a shorter run than does any big bomber in the world.

British big bombers are at least 50 miles an hour faster than any others, and they carry more than twice the bomb load. We English are apt to be much too modest about ourselves.

The Horse on the Farm

IN these days of mechanised farming there is a tendency to forget the large amount of work that is still being done by the farm horse. He may not be quite so much in prominence as in pre-war years, but in very many ways he continues to "pull his weight" on the farm. Radio talks on farming mostly ignore him, probably because there is so much to be said for the tractor, which has made possible the high-speed land cultivation of to-day.

The advantage of working with a tractor, as compared with a team of horses, is considerable in most spheres of farming operations. In ploughing, for example, a tractor and 3-furrow plough will easily plough four acres a day, whereas a team of horses will cover only one acre in the same time. This ratio applies also to most of the farm fieldwork. Nevertheless there are many jobs for which it is more economical to use the horse, such as carting manure into the fields, light harrowing, swath turning, and hay raking; and frequently horses can work on the land when conditions are too wet for the tractor. Then there are many jobs in harvest time for which the horse is still the most important power unit on the farm—carting hay and corn, for example. For this



A Ploughing Match: A fine team of Percherons. The illustrations to this article are by courtesy of "The Farmer and Stock-Breeder."

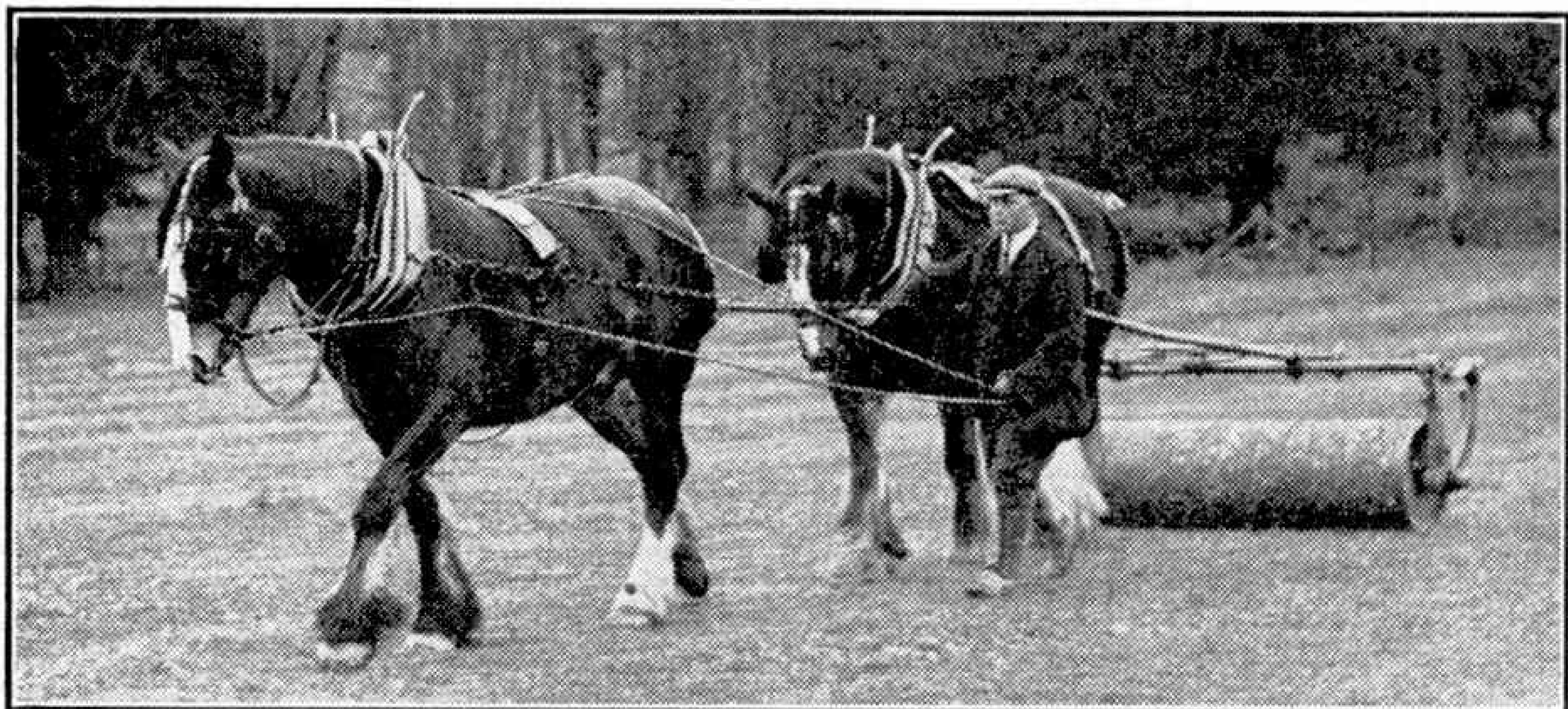
operation it is usual to have three horse-drawn carts, or wagons, working at the same time, one at the rick or dutch bay unloading, one in the field being loaded, and one empty on its way back to the field for another load.

There are four distinct breeds of agricultural horses in the United Kingdom—Shires, Clydesdales, Cleveland Bays and Suffolks. Each is represented by a special society and possesses a stud-book.

The Shire is the most important English farm horse, and for long has been known as the "Great Horse of England." He is the grandest draught horse in the world, commonly attaining a height of 17 hands (68 inches) and weighing as much as 2,000 lb. Though immensely strong, he is very docile and intelligent, and has a good free action. The prevailing colours are black, bay, and brown. The short stout legs have a plentiful covering of long hair, known as "feathering," from the back of the knees and hocks to the pasterns. The neck is well arched, chest wide and full, back short and straight, ribs round and deep, and the quarters long and level. The breed is directly descended from



In the hayfield.



Flat rolling with a fine team of Shires.

the great war horse of olden times. A typical Shire mare with foal are shown in the charming picture on this month's cover, based on a photograph kindly supplied by "*The Farmer and Stock-Breeder*."

The Clydesdale is the favourite Scottish breed, and is found also in the northern counties of England. This is a horse of extraordinary power and activity, varying in colour from brown and bay to black and dappled grey. The shoulder is more oblique than in the Shire, and there is rather less "feathering" on the backs of the legs. His average height is 16 hands.

The Cleveland Bay was always a great favourite in Cleveland, a district of strong land in North Yorkshire. He is usually about 16½ hands in height, has a short back, powerful loins and long quarters. Black zebra-like stripes above the hock, which occasionally occur, are supposed to

denote special purity of breeding. The colour is usually dark bay or brown. The mane and tail are abundant and black in colour. A fine head, sloping shoulders, strong loins, lengthy quarters, high stepping action, and abundance of bone and muscle characterise the breed.

The Suffolk Punch is quite distinct from the other native draught horses, and its clean legs and freedom from "feathering," make it specially well adapted for working on the land. The Suffolk is always a Chestnut, varying from light sorrel to dark mahogany. It has long been kept pure, and always breeds true to colour. It averages 16 hands in height and often weighs nearly 2,000 lb. The Suffolk is an exceedingly active animal, with a very finely arched neck, low shoulders, thick withers, and a deep round barrel-like build.

Now is the time of the farming year when foals are usually born—the Spring.

The majority of farmers do not work the mother for some weeks after the foal arrives unless they are really hard pressed with their spring work. Mare and foal are put out in the fields in the warm spring and summer weather, the foal feeding on his mother as often as he feels like it, and after the first three or four weeks supplementing his milk diet with luscious young grass, thus building up plenty of bone and muscle that he will need when his working days begin. It is usual to keep him until he is three years of age

(Continued on page 142)



Highland ponies drilling oats.

Remarkable Runs of Years Ago

II—The "Scarborough Flier" and other Trips

By R. A. H. Weight

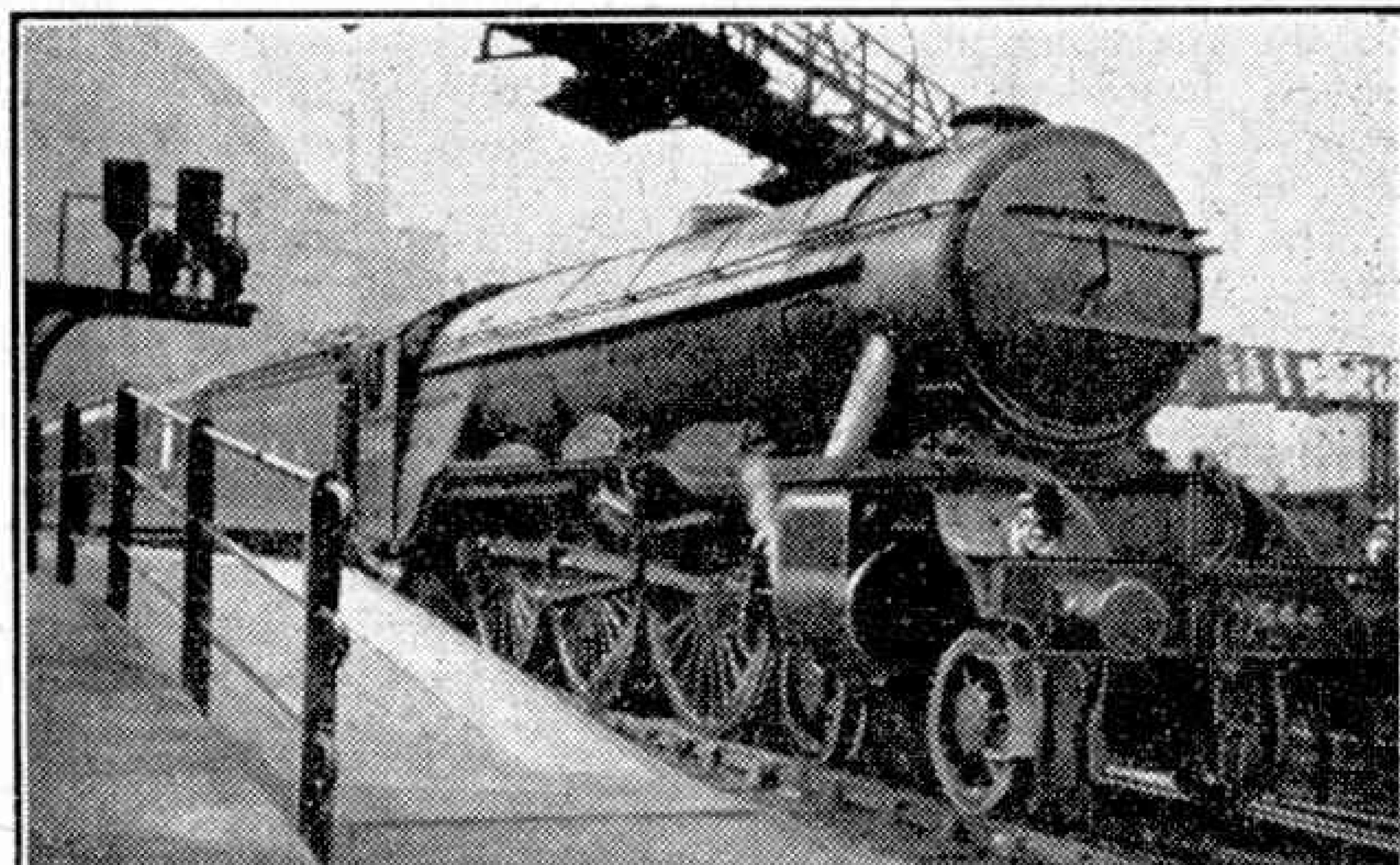
SOME months after experiencing the splendid Grantham-King's Cross run by No. 2544 "Lemberg" described last month, I was again behind the same engine and crew on an overloaded long-distance express, when a magnificent performance was logged. The "Scarborough Flier" was an officially named summer service connecting the Metropolis with the famous Yorkshire coast resort and making a fast, non-stop run in each direction over the 188½ miles between King's Cross and York.

My "red-letter day" on this occasion was an August Saturday in 1933, when this express was running in two parts; the first on which I travelled was for Scarborough only, and nearly every seat was reserved in advance. It was a huge train of 17 coaches, including three 12-wheelers and 74 pairs of wheels, and weighing 528½ tons. Fully loaded with passengers, luggage, staff and stores, the gross was nearly 570 tons, so that with her 57-ton laden tender 4-6-2 No. 2544 had not less than 625 tons to haul on a 188-mile non-stop run booked at an average of 58 m.p.h. The allowance was 195 min., quicker than on Saturdays in 1938-9; the very fast 3-hr. timing later introduced for lighter loads on Monday to Friday would not, of course, have been practicable with summer weekend line congestion and very heavy trains.

The front coach was past the end of No. 5 platform at King's Cross and "Lemberg" was rather late coming on. When attached to the train she was standing by the signal-box, so unfortunately, although I had my camera ready, it was impossible to get a photograph showing a head-on view of the "Pacific" ready to start with "Scarborough Flier" board in front. The illustration on this page shows the celebrated engine about to leave London on a summer "Scotsman." I just had time to scramble along the footway over the point rodding and up to the footplate, with the Assistant Stationmaster's permission, to wish Driver Molson and Fireman Williams good luck and to express sympathy regarding the heavy load. Before I had finished uttering those few words, the Locomotive Running Foreman, an old friend of mine, was tugging at one of my legs, saying: "Come on, it's nearly starting time." I regained my reserved seat as the whistles blew—11.50 a.m., we were off!

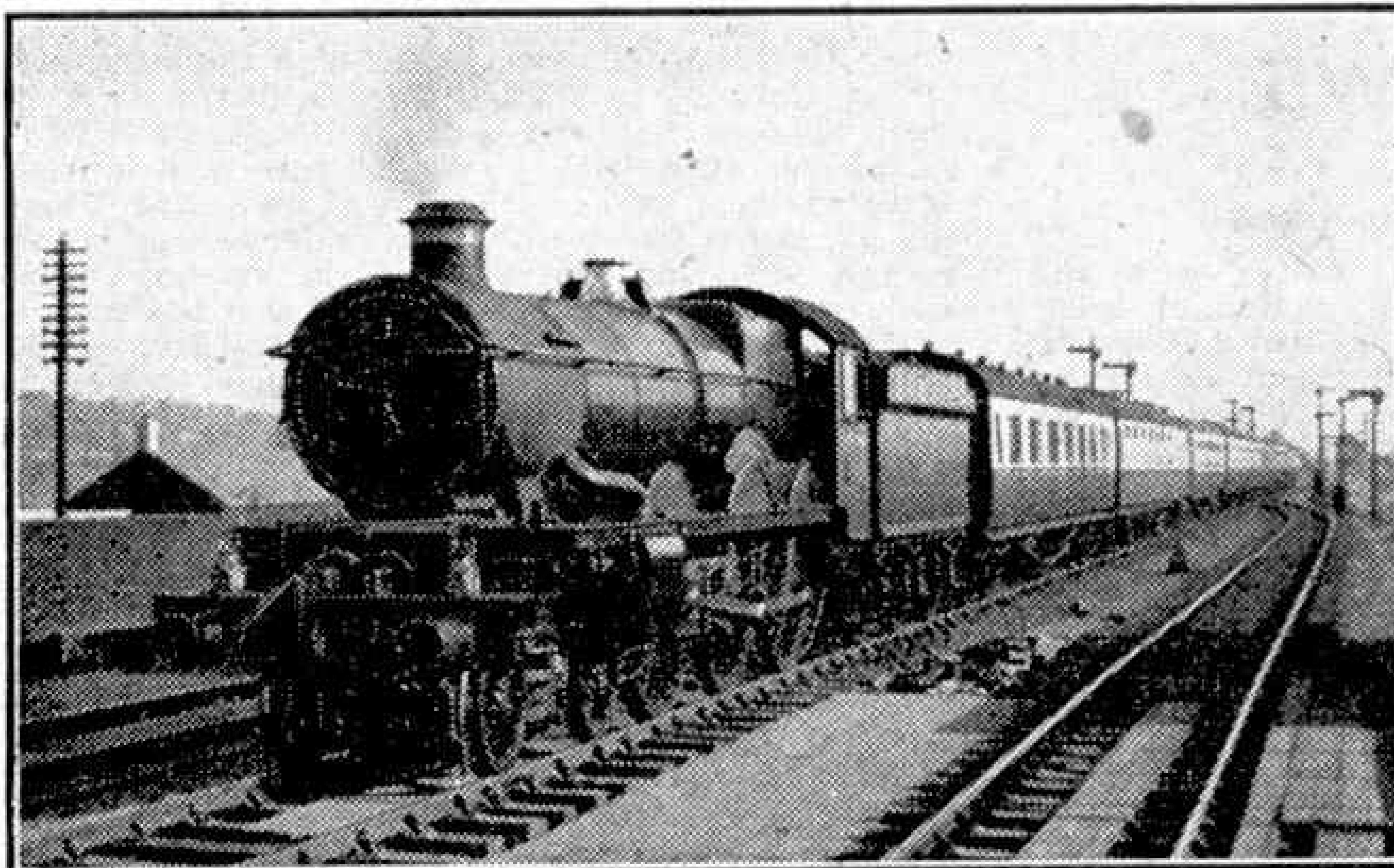
Up the nasty climb through the tunnels "Lemberg" firmly took hold of this huge train; she was still in full cry on the 1 in 110 on coming out into the open under Caledonian Road bridge, when there was a shriek from the whistle, and a slight jarring of the couplings indicating a partial closing and reopening of the regulator. Holloway North signals were "on," a most unusual blow to inflict on an outward express, which might have had disastrous results to time-keeping had the rails been wet enough to cause bad slipping, and had not our driver and fireman been quick skilfully to apply sand to the rails when the signals went "off." That slowing cost almost a precious minute.

The maximum at Wood Green was 50 m.p.h. followed by a steady minimum of 40 up to the top of the 8½-mile 1 in 200 Potters Bar bank. By mile-post 16 60 m.p.h. had been attained and over the next 59½ miles speed did not drop below the mile-a-minute rate; it was considerably more most of the way to Peterborough, in fact. Downhill maxima were 71½ below Hatfield, 87 at Three Counties and 79 near Tempsford and past Connington Box; while the fine minima with such a load at the top of rises were 60 m.p.h. at Woolmer Green, 64 at St. Neots and 55 at Leys, mile-post 62. As brakes went on approaching Peterborough, 75½ miles from the start had been covered in but a few seconds over 75½ min., grand work indeed! Signals were against us, bringing speed down to 20 m.p.h. outside, as well as in observing the service slack through the station; another minute or so lost, but we were only 1 min. behind passing schedule as we went through.



L.N.E.R. No. 2544 "Lemberg," at King's Cross. This locomotive figured in the magnificent run of the "Scarborough Flier" described on this page. Photograph by G. O. P. Pearce.

Up the long rise to Stoke summit with a cross wind blowing it was hardly possible to keep a sectional timing designed rather optimistically for loads nearer 400 tons than 600; the minimum up the final three miles at 1 in 178 was 42 m.p.h., but after that fast travel ensued over the next 53 miles past Grantham and Retford unchecked. Meanwhile I was fixed up with a seat on the mile-post side in one of the restaurant cars, for the second lunch. The harassed staff appeared to be coping successfully with scores of hungry passengers in relays and were still serving more luncheons after three o'clock. The majority of other travellers, holiday bound, were either reading, chatting or dozing; giving little thought, one fears, to the strenuously successful locomotive and footplate efforts going on up in front. As we dashed past Black Carr Junc. where the network of lines south of Doncaster begins, we had covered 153½ miles from King's Cross in 155½ min. actual, or 153½ min. net time. The last 51½ miles from Great Ponton had been run at an average of 66.7 and the train was practically to time, but a bad series of signal checks on to Doncaster then caused a loss of 3 min.



G.W.R. Paddington-Birmingham express passing Greenford, headed by No. 5036 "Lyonshall Castle." Photograph by C. R. L. Coles.

By the time we passed Shaftholme Box, four miles beyond Doncaster, where the old Great Northern ownership ceased and the North Eastern commenced, we were getting back to full speed, and had 29 min. left for the last 28 miles into York. This is on the level, but includes a severe service slack through Selby, so that despite the delays an almost punctual arrival was possible. 'Twas not to be, however! A leisurely horse, a recalcitrant motor engine, or a signalman too indulgent to road traffic, caused a bad signal slowing on account of the level-crossing gates being across the lines at Riccall, and the "Scarborough Flier" pulled up in the great York station 4½ min. late. A reasonable allowance for the delays, though excluding regular service slacks, gave the splendid net time of 192½ min., an average of 58.7 m.p.h. all the way with a 570-ton train, improving on schedule by 2½ min.

As the stop at York was for engine-changing only, it was brief. "Lemberg" had gone off to shed by the time I reached the front of the train and an "Atlantic" plus a 4-4-0 were quickly backed on as steeds for the 42-mile, 50 min. run on to Scarborough. I told a traffic official on the platform what a magnificent run it had been with a huge load. "I am sure it was," he replied, "but, my word, the fireman looked tired!" He certainly was, poor chap, but he was quite cheery when I saw him, with his worthy driver, at Doncaster in the evening; after a rest at York they had worked the redoubtable "Lemberg" back to their home station.

The nearly level 44 miles on the East Coast main line further north from Darlington to York have for a long time been the scene of regular fast travelling. For a number of years prior to the last great war, also for a time after it, the 43-min. 61.7 m.p.h. start to stop booking over that length was the quickest in the British Isles. At first the load was about 200 tons and the locomotive a North Eastern 4-4-0; next "Atlantics" with 250-300 tons or so were usual. In the 1920s "Pacifc's" of the first series were able to take much heavier loads when required, the fastest timed Darlington-York run being given to the Glasgow-Leeds evening express. I timed several good runs on it, including an interesting one behind "No. 10,000" when

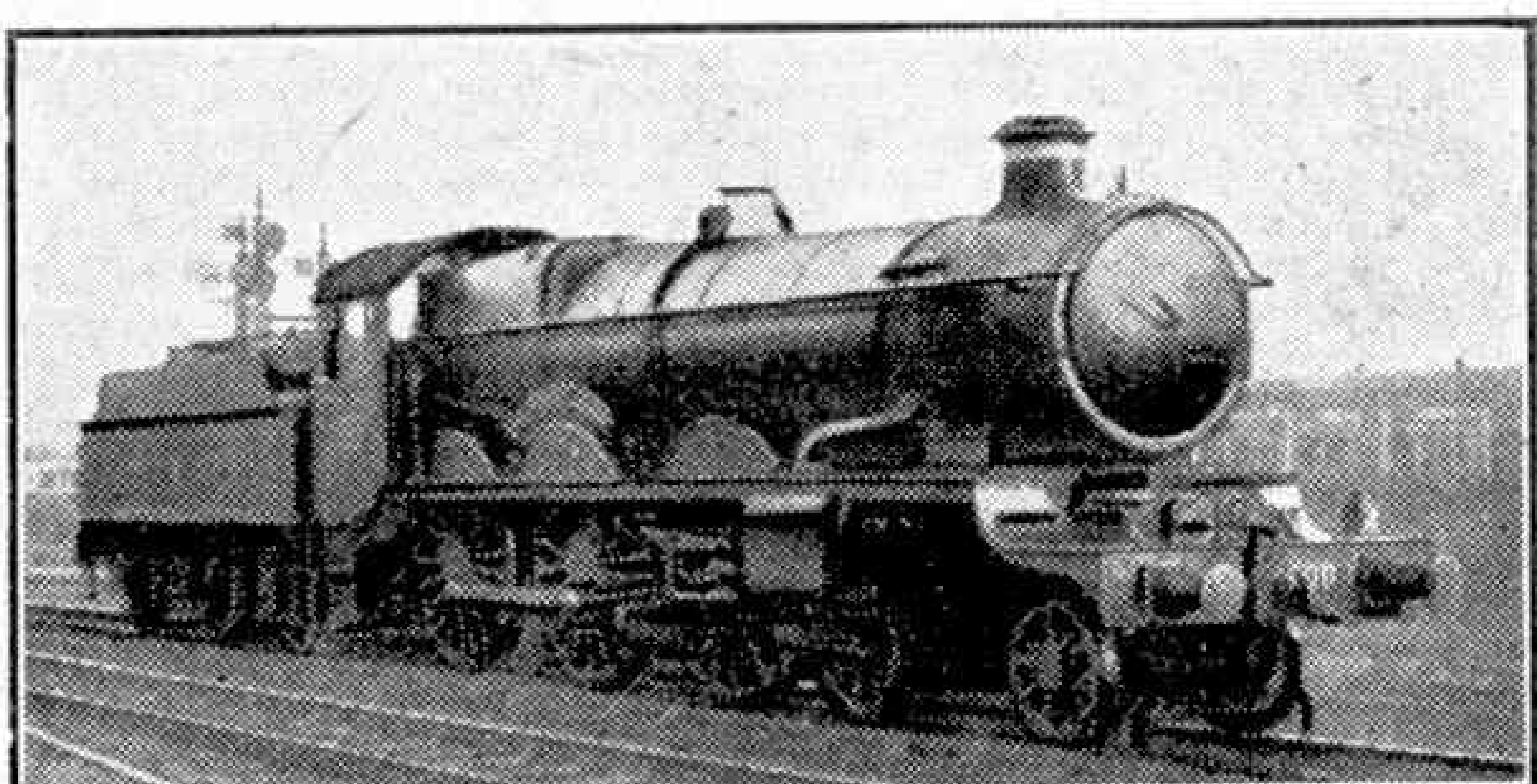
that locomotive was a high-pressure compound, with 445-tons, before the more recent accelerations gave this schedule also to the morning Newcastle-King's Cross and Newcastle-Liverpool expresses, while other heavy trains were allowed only 44 or 45 min.

When travelling south from Tyneside one summer morning shortly before the war I enjoyed a most outstanding trip over the colour-light signalled Darlington-York "galloping ground" behind another of the erstwhile "A1s" rebuilt to "A3/1" with 220 lb. per sq. in. boiler pressure, enlarged superheater, but 20 in. cylinders retained. The 14-coach train weighed fully 490 tons loaded; the engine was No. 2578 "Bayardo." The start was not particularly vigorous, yet the first 5½ miles to Eryholme Junc.,

where the Richmond, Yorks, line branches off, took barely 7½ min. Before Northallerton speed rose quickly to 78 m.p.h. and then settled down to a steady 74-76 all the way on gently falling or level track, which was a splendid demonstration of sustained power and free steaming. After a final burst of 77½ before Poppleton Junc., a smart run in to York completed a brilliant run in 41 min. 9 sec. for 44.1 miles, an average of 64.3 m.p.h. start to stop; 28 miles were reeled off at a mean speed of 74 m.p.h. with 490 tons behind the tender, and so this fastest schedule was improved on by two minutes and the arrival in York was slightly before time.

The scene now changes to the north main line of the G.W.R. I had been staying amid the Malvern Hills and made a somewhat roundabout return journey to London with an old friend, as we wished to do a little sightseeing. We changed on to the L.M.S. branch line amid the orchards of Evesham to travel to Stratford-on-Avon, which historic town was reached in a one-coach train hauled by an ex-Midland 0-6-0 from Broom Junction, on the single-line of the former Stratford-on-Avon and Midland Junction Railway, now L.M.S. From the smarter and busier Great Western station at Stratford we travelled by a local to Leamington Spa, there to join the Birkenhead-Paddington express reaching London at 8.5 p.m.

Engines were changed at Leamington on this train, an Old Oak Common (PDN.) locomotive and men working down on a slow (Continued on page 142)



G.W.R. No. 5000 "Launceston Castle," which hauled the Birkenhead-Paddington express in an exciting run described in this article. Photograph by W. J. Reynolds.

Air News

"Liberator" Bomber Re-Armed

The Consolidated "Liberator" shares with the Boeing "Flying Fortress" the distinction of being one of the few heavy bombers sufficiently well-armed to venture into the heart of the enemy's territory in daylight. Experience has shown, however, that whereas nose gun turrets are of little use in night operations they are indispensable in daylight, as Focke-Wulf pilots seem to specialise in head-on attacks. Consequently in the latest version, illustrated on this page, the "Liberator" has been re-armed, and in addition to the new Emerson power-operated nose turret with two .50 in. machine guns, it has a ventral ball turret similar to that of the "Flying Fortress." Thus armed the "Liberator" is well protected by a wall of fire from every angle of fighter attack.

Many other modifications have been incorporated, and the bomb load has been increased to a maximum of 10 tons, although the normal operational load is 3 tons. The top speed is given as "over 300 m.p.h." and the range as "over 3,000 miles."

J. W. R. TAYLOR.

Air Defence G.B.

The defence of Great Britain, and especially of the invasion ports, against enemy air attack by day or night is now the responsibility of a force called Air Defence of Great Britain, or more briefly, Air Defence G.B. It was referred to by Mr. C. G. Grey in his interesting article "Air Power in the Great Invasion," in last month's "M.M."

Air Marshal Sir Roderic Hill has been appointed Air Officer Commanding this defence force. He is 50 years of age, and his eventful Service career began in the Army, when he joined the 18th Royal Fusiliers in October, 1914. He transferred to the Royal Flying Corps in 1916, became a first-class pilot, and while serving with No. 60 squadron in France he won the M.C. He has held many important home appointments, interspersed with spells of overseas duty including two years in command of No. 45 (Bomber) squadron, in Iraq, and a similar period—1936-8—as Air Officer Commanding, R.A.F., Palestine and Trans-Jordan.

More Big American Airports Planned

A great combined airport, flying boat base, and railway station is to be constructed about nine miles from the centre of Oklahoma city, U.S.A., at an estimated cost of £6,250,000. The project as planned extends over an area of about six square miles, and for the flying boat base utilises a 2,500 acre lake near the airport site. The runways of the airport will include two 11,000 ft. long.

Big airport extensions are under consideration by Boston, Mass., including the laying down of three new runways 7,000 ft., 8,000 ft., and 10,000 ft. long respectively.

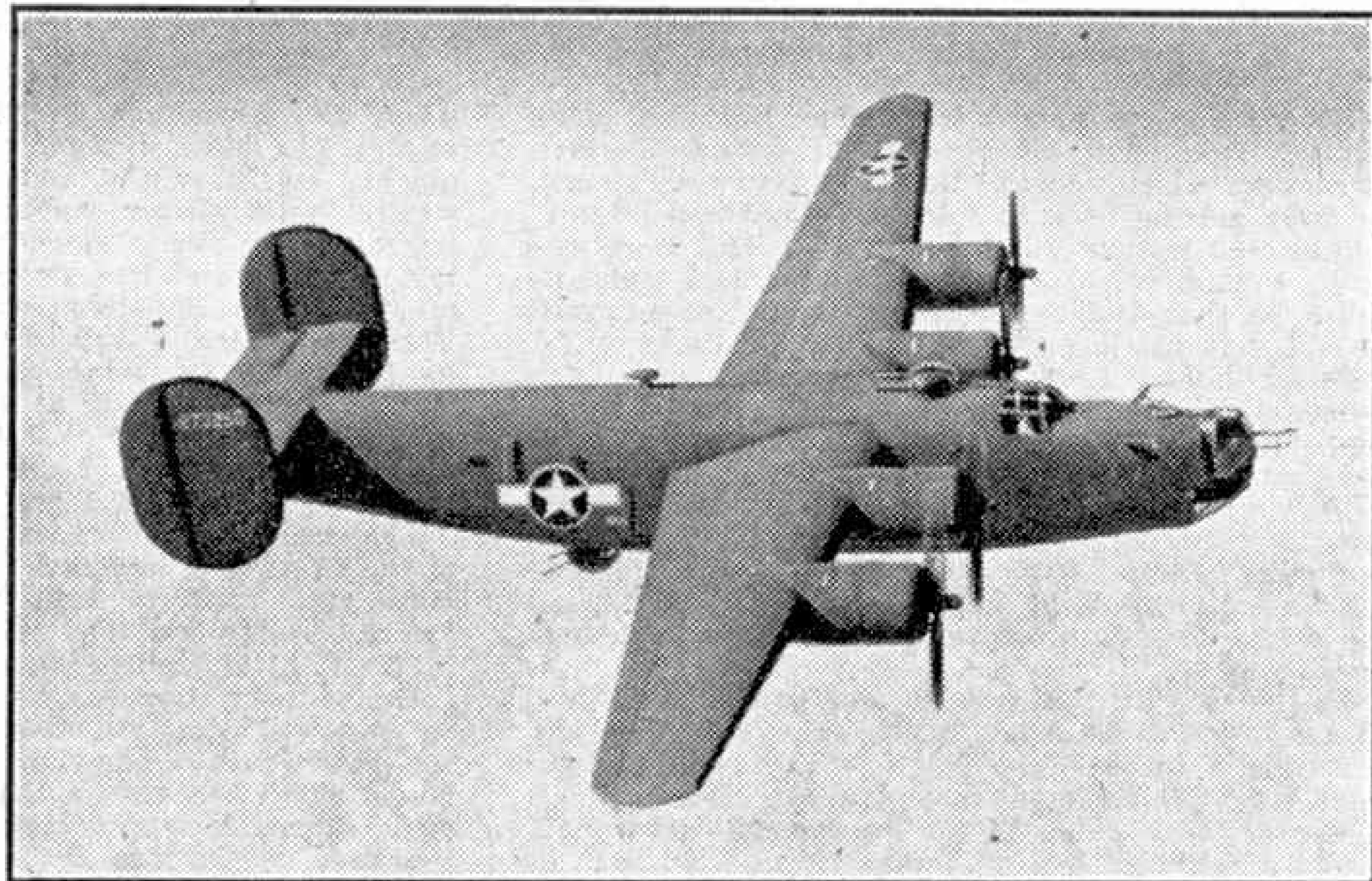
New Rolls-Royce Aero Engine

"Spitfires" are in service fitted with the latest and largest Rolls-Royce engine, the "Griffon." It is in the 2,000 h.p. class, and is of the 12-cylinder, liquid-cooled Vee type, with a cylinder bore of 6 in. and stroke of 6.6 in. A special feature of the engine is that the accessories for operating the undercarriage, wheel brakes, flaps, and generator for the wireless equipment are mounted on an independent gear-box instead of on the engine. The very small frontal area of the "Griffon," for such a powerful engine, makes it specially suitable for use in fighter aircraft.

The "Griffon" is similar in size and cylinder arrangement to the Rolls-Royce "R" engine fitted in the Supermarine S-6B seaplane with which Flight-Lieut. Boothman won the Schneider Trophy race in 1931, the historic occasion that won the Trophy permanently for Great Britain.

2,400 Miles in Nine Hours

A remarkable feat of flying has just been achieved by Capt. J. H. White, of British Overseas Airways. Piloting a "Mosquito" transport he made three



The re-armed "Liberator" heavy bomber, showing the new nose and ball turrets.
Photograph by courtesy of the Consolidated Vultee Aircraft Corporation, U.S.A.

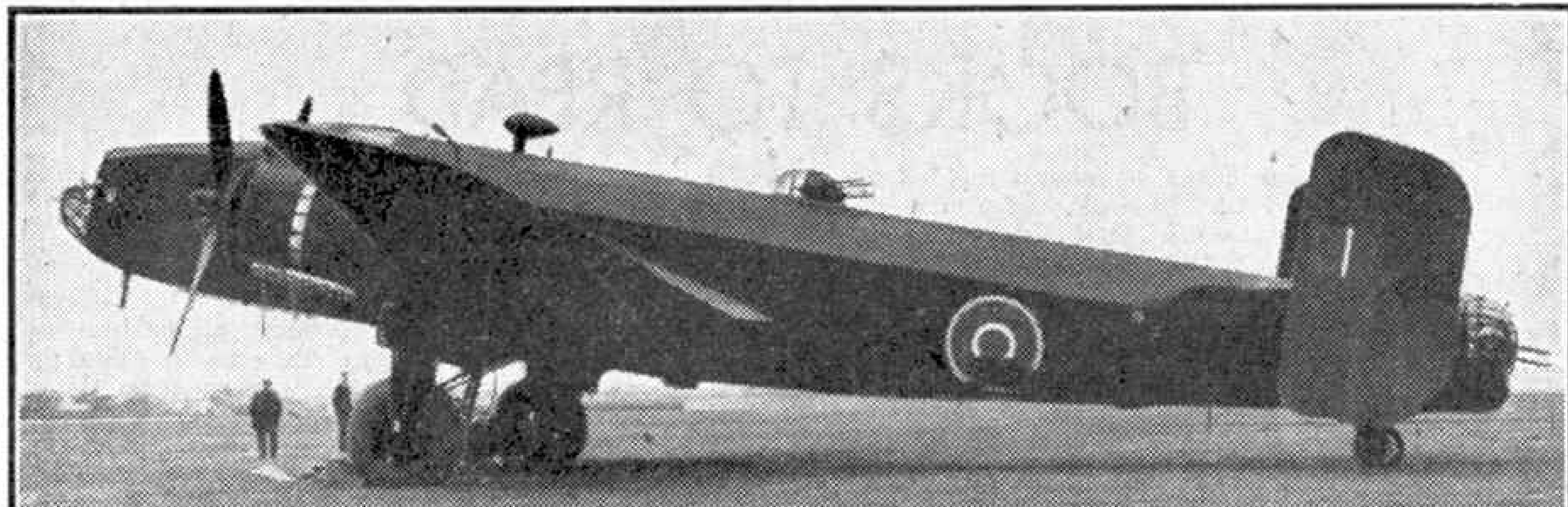
journeys, totalling 2,400 miles, in nine flying hours. There was no second pilot, the only other member of the crew being a radio officer/navigator. The whole distance was flown by instrument during the hours of darkness, and the machine was entirely hand flown, as it is not equipped with an automatic pilot. Only 9½ hrs. elapsed between the start of the first journey and the completion of the third one.

Capt. White, who is 34, is a native of Southampton, and joined British Overseas Airways in 1938.

"Mosquito" Bomb Load Doubled

D.H. "Mosquito" fighter-bombers that can carry a 1,000 lb. bomb load inside the fuselage in addition to a 500 lb. bomb under each wing are in service with the R.A.F. This bomb load is double that of the original "Mosquito" bomber of 1940. The difference is made more striking by the fact that the original machine had neither cannon nor guns, whereas this latest version is armed with four 30 mm. cannon and four .303 in. machine guns.

One third of the pilots of the Fleet Air Arm are being trained in the United States with American aircraft, as part of the Anglo-U.S. plans for combined operations against the Japanese in the Pacific.



Handley Page "Halifax" III, the latest type of heavy night bomber to go into operational service with the R.A.F. (See special article on page 113). Photograph "Flight" Copyright.

No Warpaint on U.S.A.A.F. Machines

Lockheed P-38 "Lightnings," Boeing "Flying Fortresses," and many other types of American warplanes are now going into service with the U.S. Army Air Forces without their familiar camouflage, except for certain areas in front of the cockpit, such as the tops of the fuselage nose and engine nacelles, where black panels are being fitted to protect the pilot against sun glare. A "Lightning" with this shining metal finish is shown in the lower photograph on this page.

The omission of the camouflage finish on a "Lightning" saves about 20 lb. in weight, and in the case of a heavy bomber the saving is as much as 70 to 80 lb. This modification has shortened the production time, and, it is claimed, has improved the performance of the aircraft, especially at high altitudes.

Wartime Air "Circuses"

The existence of an R.A.F. "circus" that enables pilots to gain experience in flying and in fighting against captured German warplanes was made known in 1942. This "circus" visits R.A.F. stations in this country, and its varied fleet of enemy machines includes the Messerschmitt Me 109F and Me 110, Junkers Ju 88 and Focke-Wulf Fw 190.

A British reconnaissance photograph recently pub-

lished proves the Luftwaffe also have a "circus" of this kind, and that it is using Rechlin aerodrome as a base for similar tactical training. Allied types of aircraft identifiable in the photograph include the British "Stirling," "Beaufighter," "Mosquito," and "Hurricane," and the American "Flying Fortress," "Liberator," and "Hudson." Some German types also are shown, including the Junkers Ju 88, Ju 188 and Ju 290, Messerschmitt Me 323, and Heinkels He 111 and He 177.

A story of a captured aircraft being flown in action by the enemy comes from the Mediterranean theatre. An American "Flying Fortress" formation was on a mission some 60 miles west of Rome when it was attacked by a squadron of Messerschmitt Me 210s that included a captured Lockheed P-38 "Lightning," bearing Nazi markings. This machine attacked the "Tail-end Charlie" of the "Fortress" wing and shot it down—further proof of the shattering fire-power of the "Lightning," as the "Flying Fortress" is very heavily armed and more than a match for most Luftwaffe fighters.

J. W. R. TAYLOR.

Proposed Post-War Airship Service

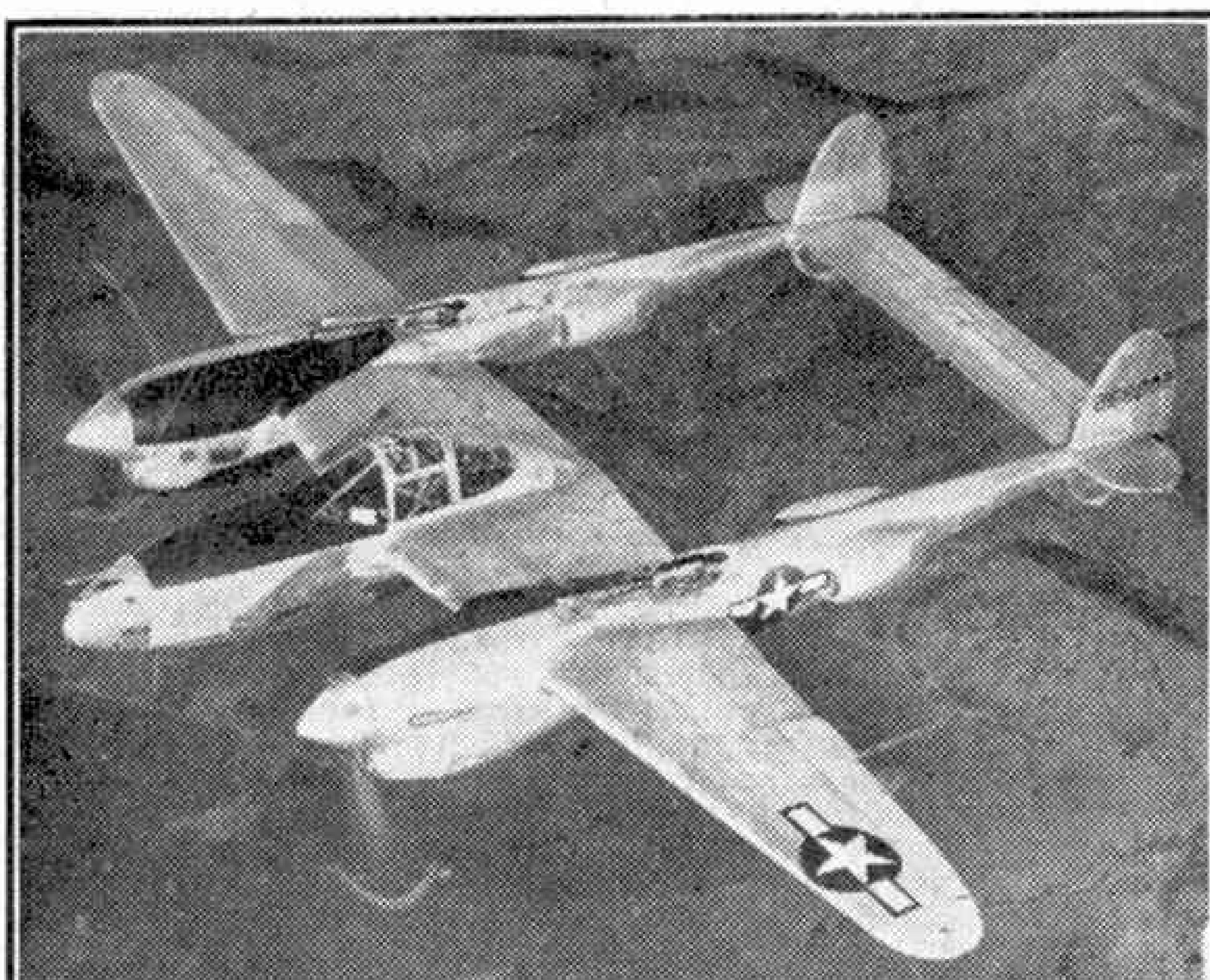
Very little is heard nowadays about airships, and therefore it is interesting to learn that a company called United Nations Airships Inc., has been formed at Delaware, U.S.A. The company intend to build

helium-filled airships, and they have applied to the Civil Aeronautics Board, the American licensing authority, for permission to use them after the war to operate commercial air services round the world. The services are planned to contact South America, Great Britain, South and West Africa, India, Australia, China and Russia.

German Twin-Fuselage Glider-Towing Aircraft

While flying together on a deep penetration of Central France recently, two "Mosquito" pilots of a Canadian squadron encountered what they at first took to be two "Flying Fortresses" wing-tip to wing-tip, but soon saw was an unusual glider "tug" towing two Gotha Go 242 gliders. This "tug" was a 5-engined, twin-fuselage machine consisting of two Heinkel He 111 twin-engined bombers side by side and joined together by a short wing centre-section in which the fifth engine was mounted.

The "Mosquito" pilots promptly attacked this strange formation, and each in turn shot down a glider, and then after a brief attack upon the Heinkel aircraft they sent it crashing down to earth.



Lockheed P-38 "Lightning" without the familiar camouflage. Photograph by courtesy of the Lockheed Aircraft Corporation, U.S.A.

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, and certain others that will be indicated, we can supply copies to readers. Order from Book Dept., Meccano Limited, Binns Road, Liverpool 13, adding 6d. for postage.

"BRITISH RAILWAYS IN PEACE AND WAR"

(British Railways Press Office. 1/-)

The importance of British Railways to the nation in peace and war is the theme of this new booklet. It commences by pointing out that the railway groups as we know them have just "come of age," for it was in 1923 that they were formed from the large number of previously independent companies. The steps that led up to this fusion are described and are of interest even to those who recall the older state of railway affairs.

The progress made by the railways "between the wars" is specially referred to; better methods, a vast programme of new works and reconstructions, and technical advances making possible more efficient equipment resulted in widespread improvement in travel facilities and service. Thus when Government control of transport was once more instituted at the start of the present war the railways were ready to play their part in the great conflict. How well they are doing so is told in the chapter "Railways at War." The mileage of loaded freight wagons shows an increase of 32 per cent. over peace-time figures and passenger travel has increased by 50 per cent. Trains indeed have travelled 1,265 million miles in spite of 10,000 hostile air attacks, the changing flows of traffic and other difficulties of wartime working, and have "got through" to the satisfaction of the military authorities and with a minimum of disturbance of civilian requirements.

A specially interesting section gives details of the big job of moving an Army, and in connection with this a remarkable double page coloured plate gives some indication of the vast number of trains needed to haul a force of the size that went to North Africa. The work of the executives who plan the strategy of the battle of rail transport, without which there would be chaos, is dealt with, and special reference is made to the close inter-working between the different systems that is such a feature of to-day, far more so in fact than in normal times.

The parts played by railway equipment and staffs both at home and overseas is described in an interesting manner, as are the adventures of railway-owned steamships and the work of railway air services. Finally comes a chapter on post-war service, in which plans for the future development of rail transport facilities are reviewed.

Both "real" and "model" railway enthusiasts will find much to interest them in the 72 pages of the booklet, which is amply illustrated. It is published by the British Railway Press Office, Waterloo Station, London S.E.1, and is on sale at bookshops and bookstalls.

"LOOK UP YOUR ATLAS"

By T. C. BRIDGES and H. ALNWICK
(Harrap. 6/- net)

Readers of this book will gather in an unusual but pleasant and interesting manner a fine general idea of the world in which they live. The authors take advantage of the delight that maps give to all of us and convey a very large amount of information with the aid of well-designed coloured maps. There is much more in the book than this, however, for the

text supplements this information admirably and almost gaily, without boring the reader. Starting with the continents we work our way through islands, oceans, lakes, rivers and mountains to volcanoes, with glimpses on the way of the face of the Earth, its weather and its people. Altogether an attractive book, well illustrated and produced.

"A GANG OF TEN"

By ERIKA MANN
(Secker and Warburg. 6/- net)

The gang comes from the New World School, an American institution that opens its door to British, French, Dutch, Norwegian, Russian and Chinese children, refugees or evacuated from their own countries, each with interesting experiences to speak about. The strangers eagerly learn American ways of doing things, and in their turn teach the American members of the gang a great deal. Then events become more exciting when suspicion arises that Axis spies are at work. This suspicion grows into certainty, and something has to be done to save a great Coast Guard base and an important aircraft factory, both of them near the School, that are threatened with destruction by the spies. It is done effectively, but in the way that children would be expected to do it, and the story is decidedly thrilling while retaining a pleasantly humorous flavour.

The book is illustrated with excellent line drawings.

"CANADA AND HER STORY"

By MARY GRAHAM BONNER (Harrap. 5/- net)

One of the greatest gains of the war situation is that we are all learning more about the New World. Canada is one of the countries in which the keenest interest is taken, and here is a little book that gives a straightforward account of that great and varied Dominion. It is accurate and informative, ideal for the boy who wishes to know something about Canada, and enjoyable also for adults.

The story of the upper part of the North American Continent is told from the very beginning, when Cartier, the French explorer, made his way up the St. Lawrence to an Indian settlement called Kanata by its inhabitants. Cartier apparently took the name to be that of the country, which has retained it ever since. Then we read of the coming of Champlain and other Frenchmen, and of the British explorers Cabot, Frobisher, Hudson and others, and this part of the story ends with the settlement of the rivalry between French and English in the battle between Wolfe and Montcalm on the Heights of Abraham. Next we see how the great North West territory was opened up, first by the fur traders and then by the building of the railway, and so we come to modern Canada, with its network of railways, its great wheat-growing prairie region, its mining centres, orchards and fisheries. The work of the famous Royal North West Mounted Police is admirably described, and we read of the marvellous national parks in the Rockies, the discoveries of radium and gold in Arctic regions and the wonderful development of British Columbia, the "sea of mountains," with its snowy peaks, glaciers, waterfalls and lakes, and its rich soil and magnificent climate.

The book is well illustrated and includes a list of the principal events in Canada's history, with a map.

Owing to wartime difficulties, it is impossible to guarantee prompt delivery of books ordered as described at the head of this page, but every effort will be made to ensure speedy despatch.

Engineering News

Mosquitoes of the U.S. Navy

The United States Navy's modern P.T.B's., or patrol torpedo boats, have fitted admirably in the Allied campaign to cut off and seize enemy strong-holds in the South Pacific. Because of their small size and their comparatively minor requirements in the way of installations, they can be based in the inlets and river mouths that abound in the tropic island groups.

The men of the P.T. squadrons live in comparative comfort in bases they have hewed out of the "gumbo" soil with the aid of natives, where they are screened by overhanging trees and the camouflage they have added. Then at night they slip out for the sudden attacks that have earned them the name of "Green Dragons" from the apprehensive Japanese. Patrol torpedo boats from such bases took part in the campaign that crumbled the Jap. bastion at Lae, in New Guinea. They are the mosquitoes of the U.S. Navy, and their sting is deadly. Striking against enemy Goliaths, they match terrific speed, hardiness and ability to turn quickly and in small circles, against the power of big guns and the ever-present risk of mishap in high seas.

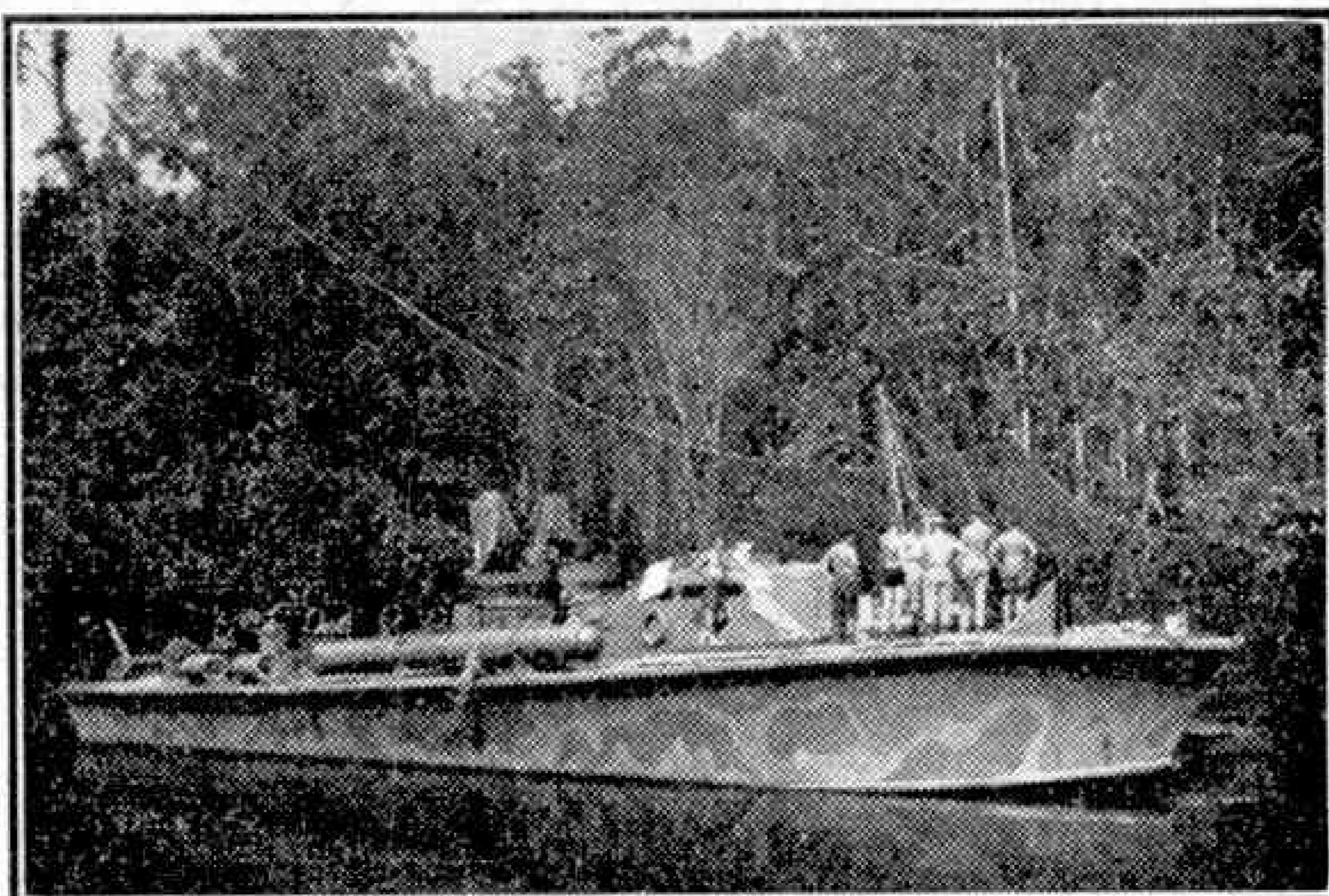
M. LORANT.

Straightening a Skyscraper

When a 24-storey steel and concrete building was completed in Sao Paulo, Brazil, it was discovered that the ground had settled at one corner, so that the skyscraper leaned over to the extent of 2 ft. The building has now been effectively straightened up after 21 months' work on it.

It was decided to raise the building at the settled portion by means of hydraulic jacks, by freezing the soil below it and building deep concrete piers to

were brought up to a height allowing them to provide the necessary support for the jacks. Of these 40 were used, and with their aid the building was tilted over until its top was only a quarter of an inch out of the original line.



A patrol torpedo boat of the United States Navy. This "Green Dragon," as the Japanese call the boats, blends well with the jungle background at its base in the Far East.

Giant Concrete Barges

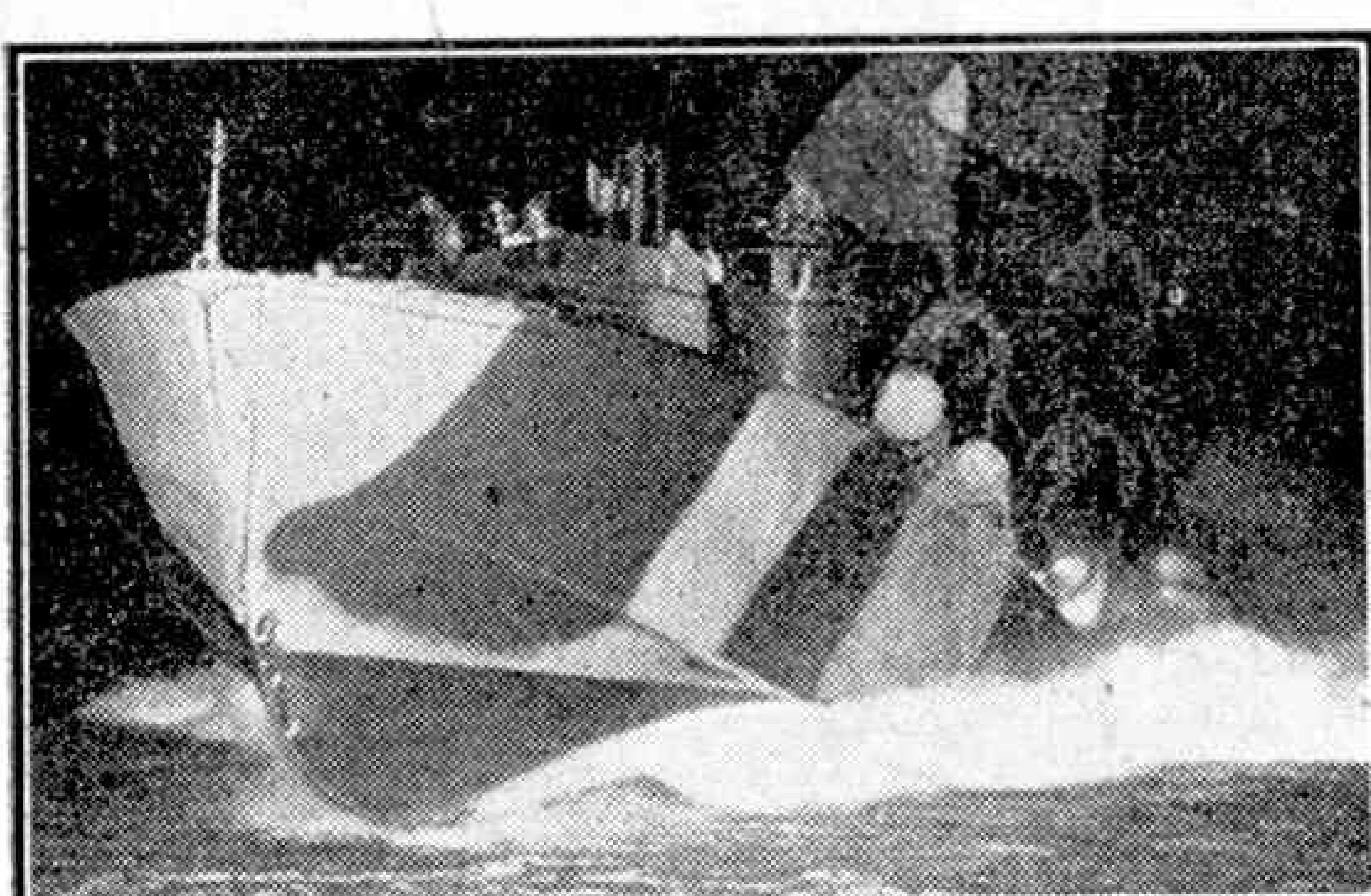
Reinforced concrete barges of many different sizes have been built in the United States in order to meet wartime conditions. Among these are 30 of 11,000 tons displacement, which are intended for use in all parts of the world, to which they can be taken by ocean-going tugs. They are 366 ft. long, with a beam of 54 ft. and a draught of 26 ft. 3 in. when loaded.

In the construction of the barges steel plates are used for the stem and the stern, and the rest is of reinforced concrete, 5 in. thick for the bottom and 4½ in. for the sides. Nearly all the reinforcing steel is placed in position before concrete is poured and the bulk of this is poured continuously to within 3 ft. of the main deck level, so that there are no joints below or near the water line. Deck houses at the bow, at the stern and in the centre are joined by an elevated walk or gangway. Bulkheads both transverse and longitudinal, that is across and along the barge, divide the space into 20 main compartments. The steering gear is operated by power, as are winches for the anchors and the towing cables houses.

Bright Colours for Machines

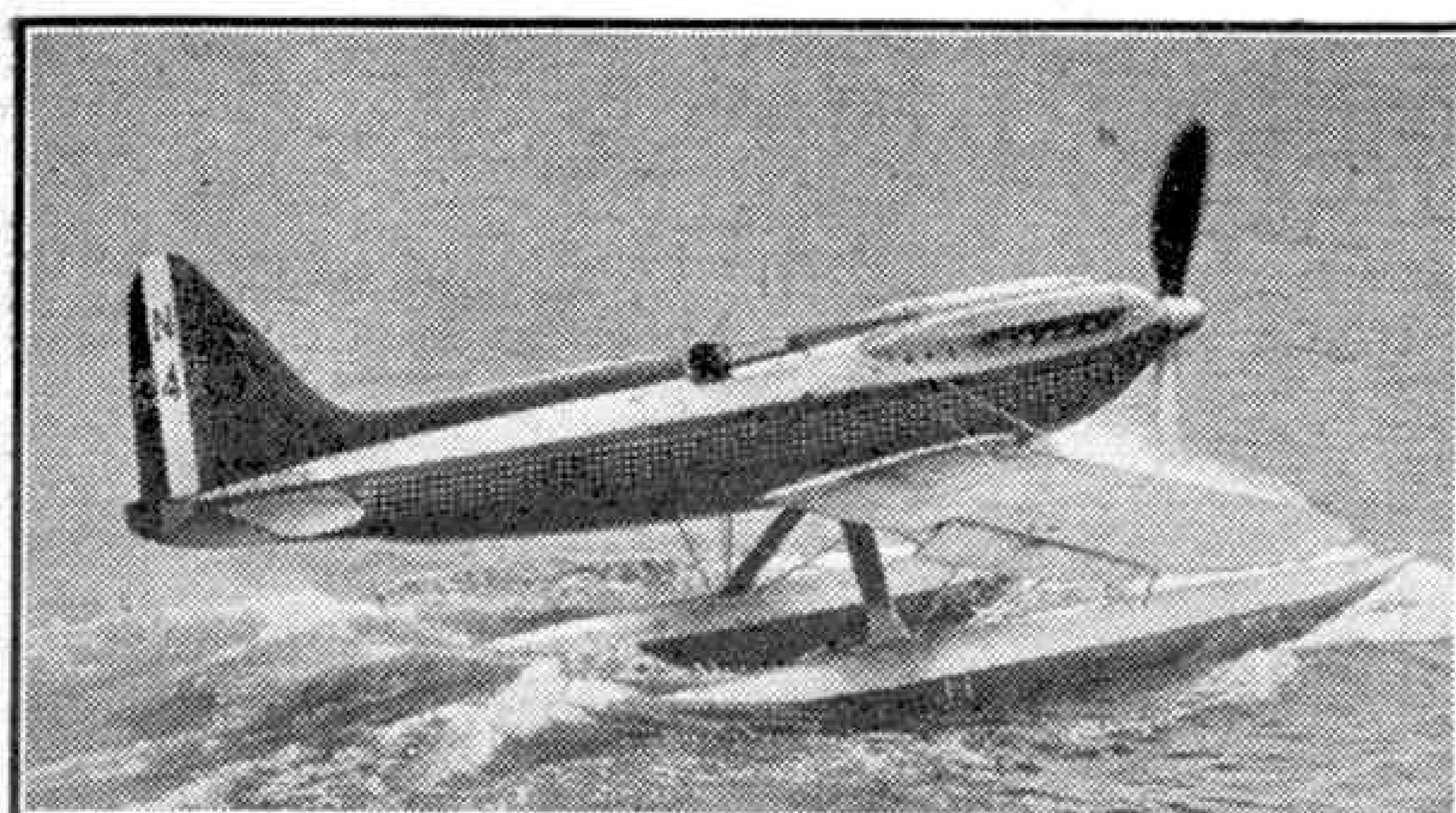
Why are machines in engineering workshops painted black or dark grey? This is a question that has been asked in an American machine shop, where it has

been discovered that other colours have distinct advantages. Black and grey do not reflect much light, and when paints of these colours are used there is usually insufficient contrast between the work and parts of the machine around it. Lighter colours have proved more effective in every way, providing the necessary contrasts and avoiding troublesome shadows. The best colour was found to be light buff.



A squadron of patrol torpedo boats on the Atlantic coast before leaving for the war zone.

provide a substantial foundation. Double walled pipes were driven to a depth of 60 ft. in the ground, and through these a refrigerating brine solution was circulated for eight months. By that time the ground was frozen to a temperature of 20 deg. C. below freezing point. Holes 4 ft. across were then excavated through the base of the building into the frozen soil and filled with concrete to form the piers, which



The Supermarine S.6, famous forebear of a great series of fighters.
Photograph "The Aeroplane" Copyright.

The "Spitfire"

By John W. R. Taylor

THE most famous aeroplane of this war is undoubtedly the Vickers-Supermarine "Spitfire." The very name symbolises that speed and punch for which this superb little fighter 'plane has become a watchword in every corner of the globe.

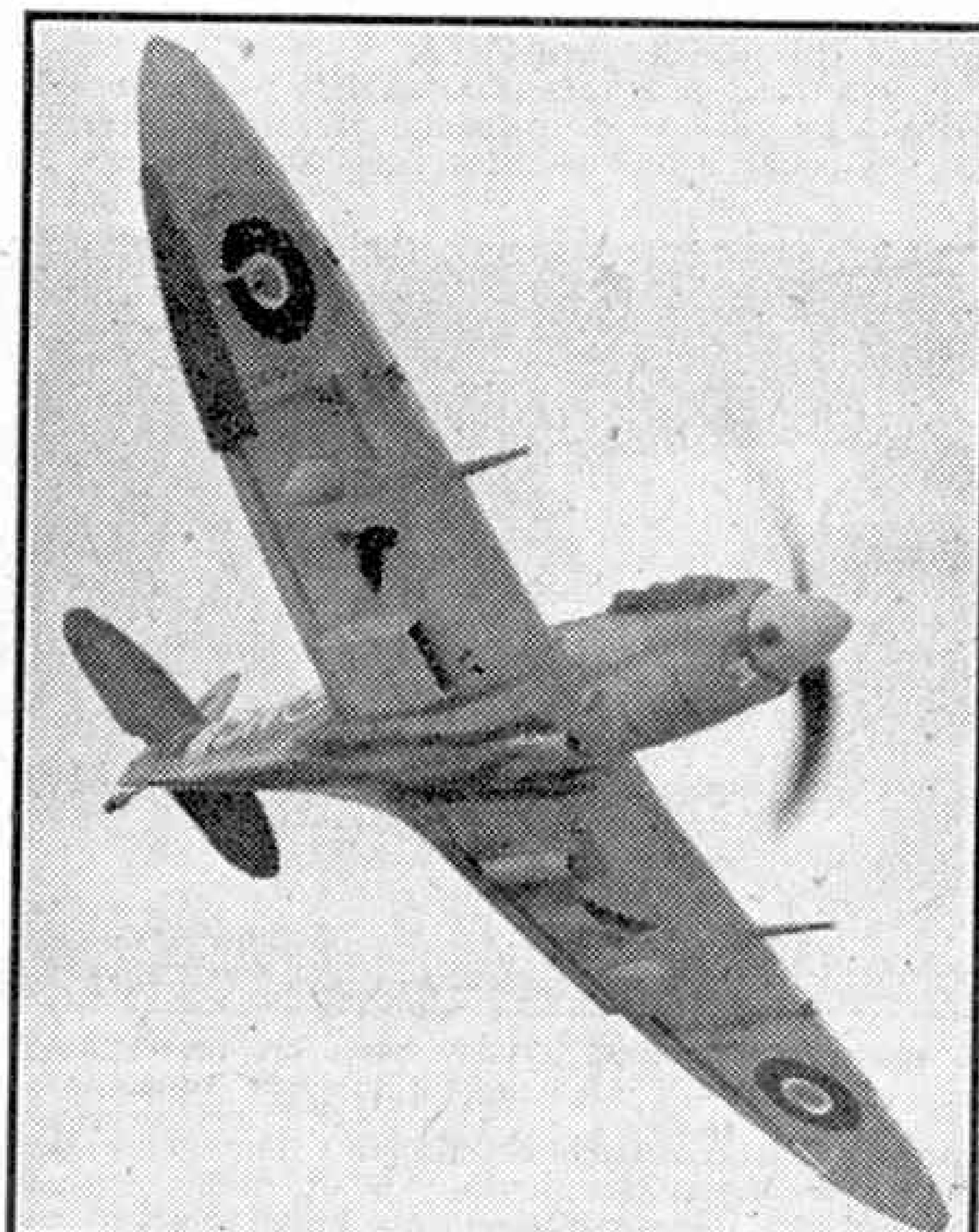
Because of its graceful appearance and small size, the "Spitfire" was at first considered by the Luftwaffe to be more of a pretty toy than a serious menace. The Battle of Britain changed that opinion. Although that battle was undoubtedly the "Hurricane's" triumph, "Spitfires," although in much smaller numbers, won for themselves a tremendous reputation. While the "Hurries" smashed their way through the German fighter screens to tackle the hordes of "Stukas," Heinkels, and Dorniers, "Spits" engaged the Messerschmitts, outmanoeuvring and outshooting them at every turn; until after a time a frenzied "Achtung Schpitfeuer" over the radio was sufficient to cause the Luftwaffe fighter escorts to put their nose down and scurry back to their bases, leaving the bombers to their fate. Seldom did such desertion help the Me 109s, however, as the faster "Spitfires" were able to catch up with them time after time to add yet more smouldering piles of wreckage to the funeral pyres of German hopes that littered the harvest fields of Kent, Sussex and Surrey.

What was the reason for the phenomenal success of the "Spitfire"? The answer is to be found many years earlier. In 1927 England was in danger of losing the coveted Schneider Trophy for ever. The

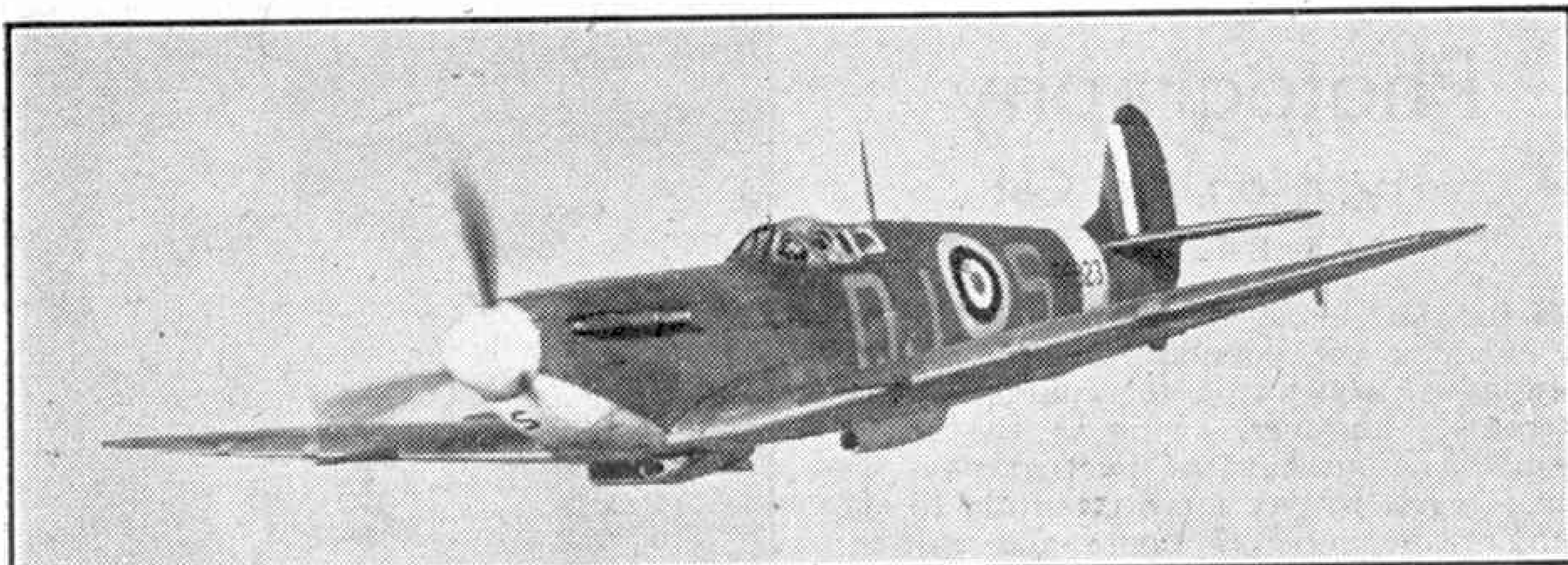
Italians had won it twice, and one more victory would have gained it outright for them. But a young English designer named R. J. Mitchell was not content to sit back and see foreign powers sweeping the board at all race meetings. For many years he had envisaged a revolutionary cantilever monoplane with extremely clean lines. In 1925 he was given permission to build his dream-plane; the result was the Supermarine S.4 which set up a new world speed record, only to crash shortly afterwards in the 1925 Schneider Trophy Race. It had nevertheless paved the way for Mitchell's second monoplane racer, the S.5, whose achievements

have passed into history.

Capable of outflying every aeroplane ever built, the S.5 with its powerful 875 h.p. Napier "Lion" engine not only won the 1927 race but set up a new world speed record of 281.5 m.p.h. At the next two meetings for the Trophy the S.5, and its successors the S.6 and S.6b, the latter



"Achtung Schpitfeuer!" A Vickers Supermarine "Spitfire" Vb. Photograph "The Aeroplane" Copyright.



Another fine flying view of the Vb version of the "Spitfire."

with the tremendously powerful 2,300 h.p. Rolls "R" engine, were the foremost contestants, winning the 1929 race at a speed of 328.6 m.p.h. and the 1931 race at 340.8 m.p.h. Finally in 1931 Flight-Lieut. Stainforth set up a new world speed record in the S.6b by attaining the remarkable speed of 407.5 m.p.h. The Schneider Trophy had been won outright for Britain. Mitchell had every right to be pleased with his little monoplanes.

The year before the latter success, however, Supermarines produced a small low-wing fighter monoplane with a fixed spatted undercarriage. In spite of its sharply cranked wings, the resemblance to the Schneider Trophy seaplanes was obvious in its delicately rounded fuselage. It was in fact a Schneider Trophy seaplane with a Rolls-Royce "Goshawk" engine, suitably re-designed and strengthened for sterner duties as a single-seat fighter. Armed with four machine guns, it was christened "Spitfire," and was thus the first aeroplane to bear that famous name.

This "Spitfire" was not built in quantity, and not until 1936 did the prototype of the present series first take to the air. It was indeed a beautiful little aeroplane. The fuselage lines of the S.5 and S.6 were still apparent, but it was for its wing shape that the "Spitfire" became famous. During the Battle of Britain even the least air-minded of the public could recognise a "Spit" because of its "pointed wings." This is not quite accurate, as they are really elliptical in shape, thus utilising what experts consider the ideal form for aircraft wings.

The first "Spitfire" squadron was not formed until 1938, but from that date the machine has been manufactured in ever-increasing numbers. Many thousands have been built, and the type has undergone steady development without losing

any of its original cleanliness of line. Performance and fire power have improved by leaps and bounds. The 1,030 h.p. "Merlin" engine of the prototype has been superseded by the 1,280 h.p. "Merlin" XLV on the Mark V and the 1,600 h.p. "Merlin" 61 on the Mark IX. In consequence the top speed has gone up from 360 m.p.h. to "well over 400 m.p.h." The 220 lb. of lead a minute spat out by the eight Browning guns of the Mark I have given way to 600 lb. a minute on the four cannon Mark Vc and Mk. IXc, and 410 lb. a minute in the two cannon and four machine-gun versions.

But enough of figures: it is on results that the "Spitfire" has built up its reputation. Its part in the Battle of Britain is well known. Since then it has played the leading part in our offensive "sweeps" over Occupied Territory, blasting countless Messerschmitts and Focke-Wulfs out of the skies above their own bases. Poles, Czechs, Norwegians, Americans, Belgians and Russians—all have flown "Spits" and shared in the admiration felt by British pilots for a grand fighter. Britain, Occupied Europe, Libya, Malta, Tunisia, Sicily, Italy, Australia—these are its battlefields. In addition "Seafires" are at sea on our aircraft carriers, and have done much to protect our ships from the long-range bomber.

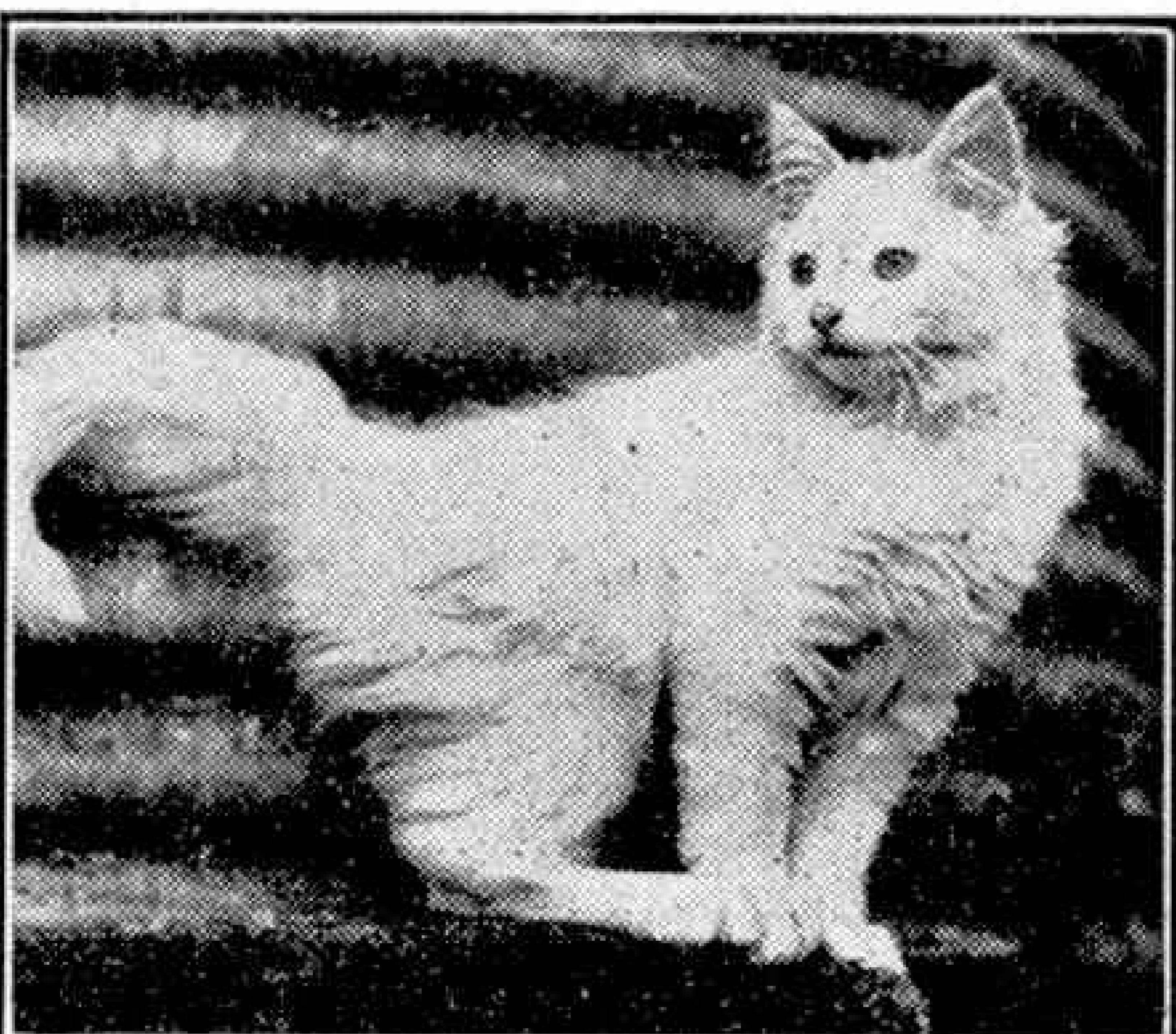
In spite of all these achievements the "Spitfire" is not yet by any means at the final stage of its development. It has successfully kept pace with more recent fighter planes such as the Focke-Wulf 190, and there is every reason to believe that the next few years will see still further improved "Spitfires" that will fly over a free Warsaw, and a free Prague just as the Mark I's flew over a London that they had helped to keep free in the bitter months after Dunkirk.

Photography

Try it on the Cat

By E. E. Steele

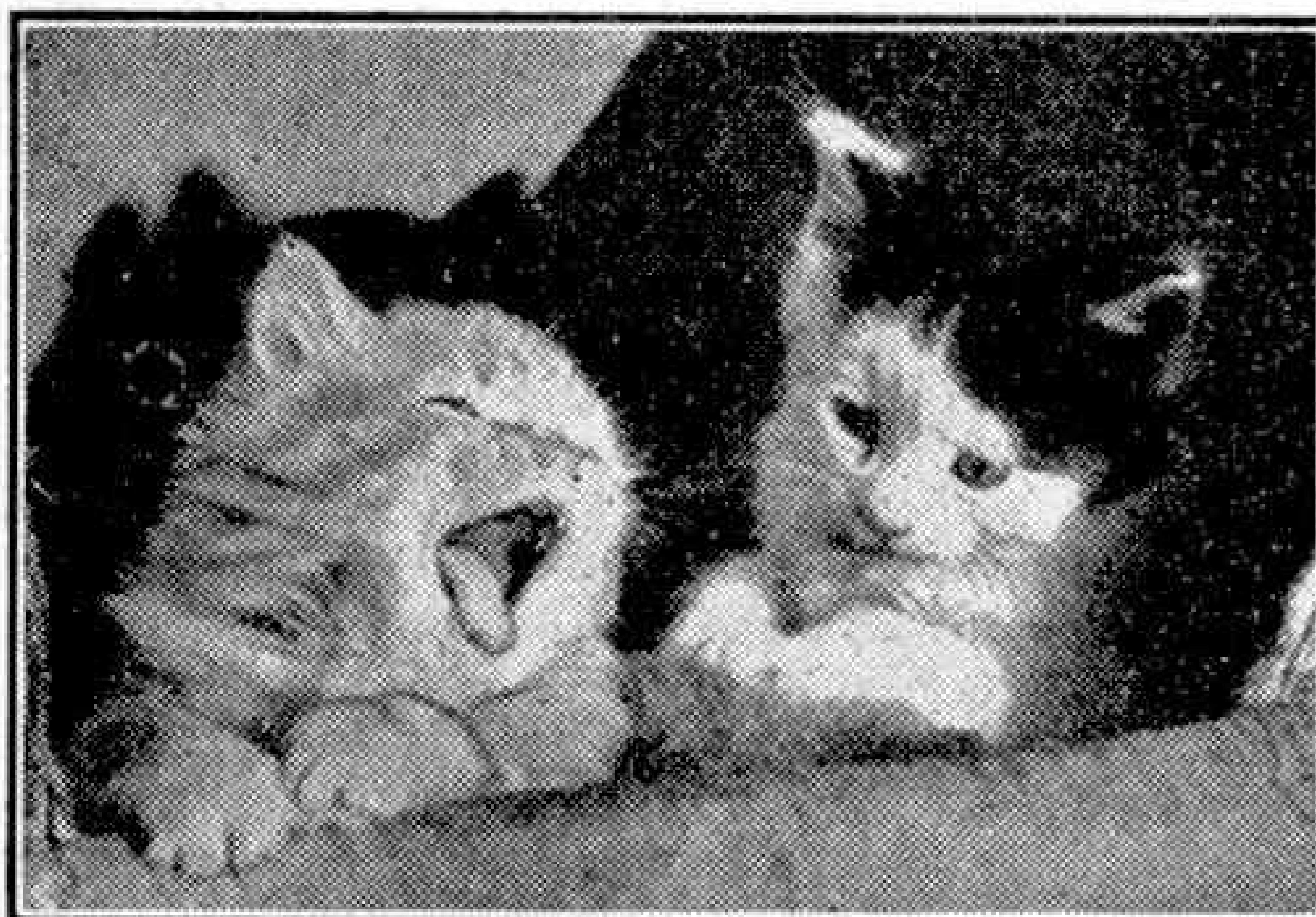
IN the past, most of us have been apt to overlook the possibilities of household pets as subjects for photographic portraits. Recently, however, owing to the severe restrictions on outdoor photography, we have begun to pay more attention to the subjects available in house and garden. As a result, many very beautiful cat photographs have been produced, and some of them have found their way into the big exhibitions where only the best



"Our Snowball."

The photographing of kittens as a rule is a process of stalking, with the camera ready for instant use when an opportunity occurs. Often the chance comes quite unexpectedly, as was the case with the yawning kitten illustrated here.

If your camera is of a focussing type, it is best to focus sharply on the eyes; this ensures that the rest of the animal is sufficiently sharply defined. If it is of the box or other similar type, do not make the mistake of approaching too near your subject with the object of getting a slightly larger picture. A good negative, however small, can always be enlarged, whereas an unsharp picture is hopeless for any purpose.



"It's rude to yawn like that!"

pictures are accepted.

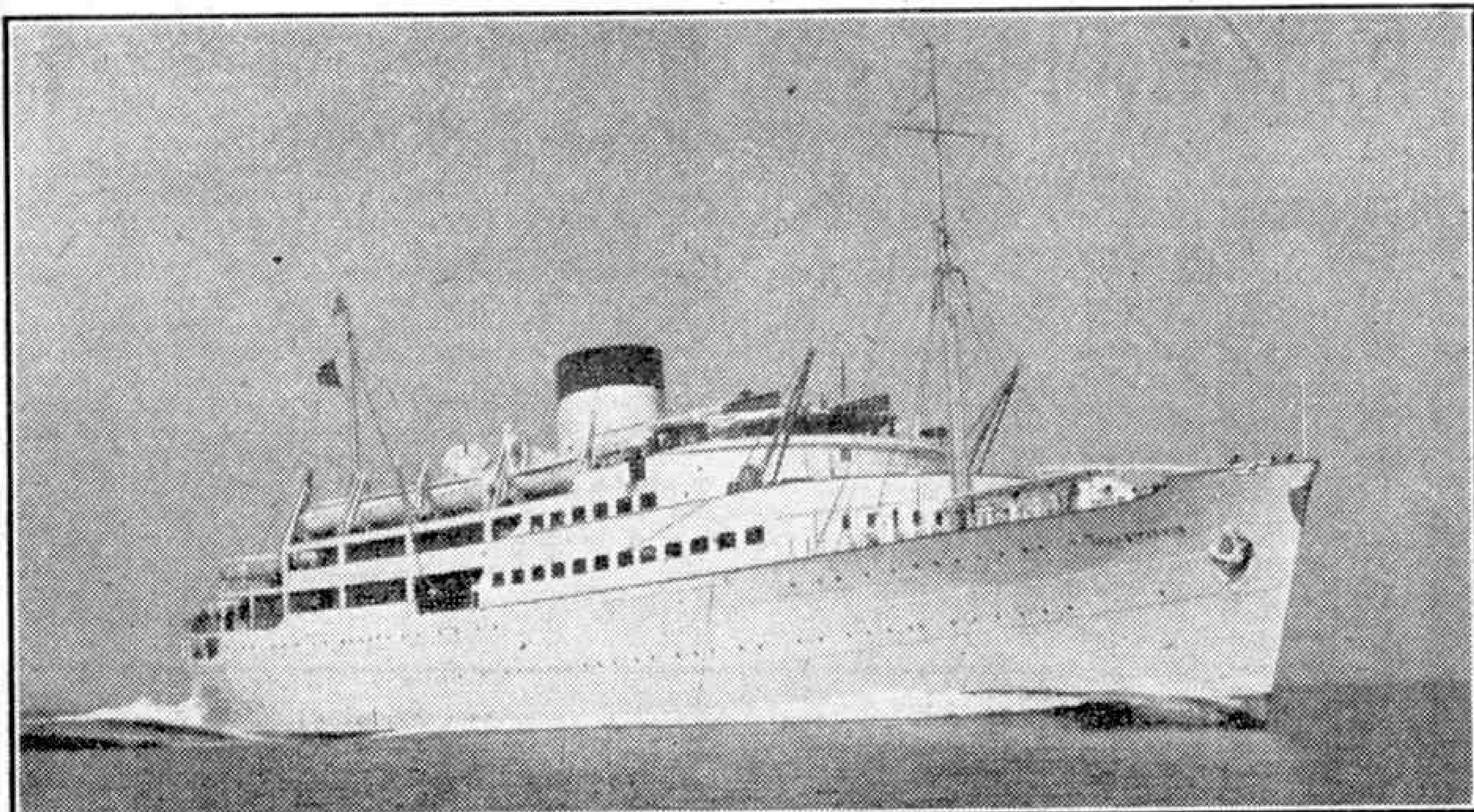
The first essential to making good cat pictures is to find out what the animal thinks about the process. Some cats seem to grasp the idea at once, and meet us half-way in our attempts to pose them where we think they ought to sit. Others dislike the whole business, and although something can often be done by judicious bribery, the best pictures of such cats are usually to be got when they are not aware of the fact.

Most pet cats have little habits peculiar to themselves, and these can often be made to provide very attractive pictures.

With cats that will consent to be posed to some extent, the background chosen should be as plain as possible, and of a suitable colour so that the animal stands out in relief. A dark cat looks best against a rather light background and a light cat against a dark one; but violent contrasts in light and shade are not necessary, and indeed should be avoided.



A straight left!



M.V. "Transilvania."

Two Fast Motor Ships

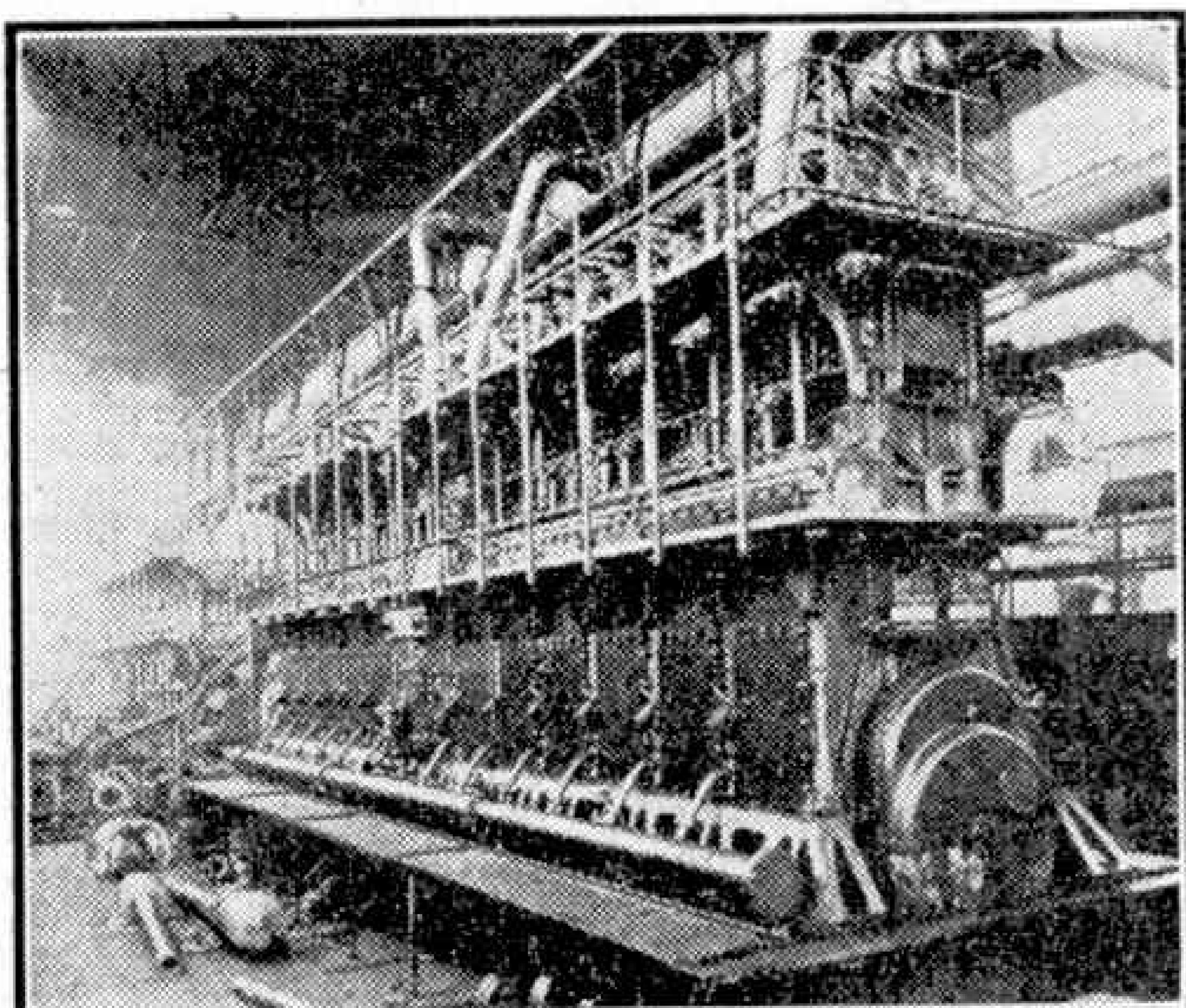
By Denis Rebbeck, M.A. (Cantab.), A.M.I.Mech.E.

TWO very fast twin-screw motorships, the M.V. "Transilvania" and the M.V. "Basarabia," built by A/S Burmeister and Wain's Maskin-og Skibsbyggeri at Copenhagen, to the order of the Roumanian Port and Shipping Authorities (P.C.A.) for Serviciul Maritim Roman of Bucharest, were completed just before the war broke out, and in consequence never got the publicity which they deserved. These fine ships have been riding at anchor at Istanbul ever since hostilities broke out between Soviet Russia and Roumania; they have been fortunate in escaping the fate of many other fine ships possessed by the belligerent countries, which have been sunk.

The "Transilvania" and her sister ship were built to ply the Black Sea and the Mediterranean on the Constantza-Alexandria service, calling en route at Istanbul, Piraeus, Haifa and Beirut. Their principal dimensions are: overall length 432 ft. 6 in., length b.p. 400 ft., beam 57 ft. 9 in., depth 30 ft. 3 in., and gross tonnage 6,672. The capacity of the holds is 100,000 cu. ft. and the fuel oil bunkers carry 800 tons. The speed at normal output is 22.5 knots, the two main engines developing 14,400 indicated horse power at this speed.

These modern Diesel-driven passenger liners are designed to carry over 450 passengers in three classes, and have very luxurious accommodation. It is interesting to note that the ships are able to float with any two compartments, or watertight subdivisions, open to the sea. An attractive feature of the accommodation is the covering of the walls with paintings of castles and buildings in the provinces of Transilvania and Basarabia, after which the vessels are named. The crew consists of 120 men, and each ship has the usual equipment such as radio direction finder, echo sounder, smoke detectors, etc. The ships look very attractive, being painted white above and green below the water line.

Probably the most interesting feature of each ship is the engine room. Here there are two 12-cylinder Burmeister and Wain single acting two-cycle trunk piston Diesel engines of 620 mms. (24.4 in.) bore and 1,150 mms. 45.27 in.) stroke. One of the main engines is seen, in our lower illustration, on the test bed in the erecting shop at Copenhagen. There are also three smaller 6-cylinder Diesel engines of 220 mms. (8.66 in.) bore and 370 mms. (14.56 in.) stroke, developing 360 brake horse power each at 400 r.p.m. and coupled direct to 240 kilowatt dynamos of 220 volts. All pumps are electrically driven; the pistons of the main engines are oil cooled, whereas the cylinders are fresh-water (Cont. on page 142)



One of the main engines on the test bed.

Railway News

A Remarkable Harrogate-Leeds Run

Nearly all the lines in the West Riding of Yorkshire are steeply graded and the secondary main route between Harrogate and Leeds is no exception. The main climb is on each side of, and through, the long Bramhope Tunnel, 2 miles 234 yards in length, situated on high ground. The train was the 10 a.m. express Newcastle to Liverpool, via Sunderland, Stockton, Harrogate, Leeds and Manchester, L.N.E.R. operated as far as Leeds (City), when running on its peacetime schedule, weighing 280 tons and hauled by "V2" 2-6-2 No. 4779 from Heaton shed, Newcastle.

The start from the Yorkshire spa is sharply downhill, but a slack to 25 m.p.h. was carefully observed past Crimble Junction; then comes an uphill stretch past Pannal, followed by four miles down, mostly at 1 in 195, which brought speed up to 66 m.p.h., so that the fast time of 10½ min. was made to passing Arthington, 9 miles, allowed 13 min. Then the average of approximately 51 over the 4½ miles to Horsforth, including three miles up at 1 in 94-97 through the tunnel, with a minimum of 30 m.p.h. at the top of the bank, was a splendid effort. Indeed, the time occupied in traversing the tunnel was barely half a minute more than that regularly taken by trains going down the bank, which often start the descent at a modest rate.

Following a maximum of 68 under very easy steam down the 1 in 100 past Headingley, well known for its county cricket ground, a stop was made at Holbeck, amid grimy junctions and industrial activity presenting plenty of interest to the railway enthusiast, in 22½ min. for the 17½ miles start to stop, thus representing a gain of 3½ min. on the fastest booking. Without a call at Holbeck, the train would have been in Leeds in 25 min., which spirited performance was 2 min. better than the best run recorded by Mr. J. W. Hague behind a "Pacific" on Pullman and other expresses that used to traverse this route.

S.R. Tidings

In the last two years before the outbreak of war an average of 220 million car miles per annum were run by electric stock in passenger service. To keep this intensive time-table in operation 530 million units of electricity were needed each year, representing the consumption of about 350,000 tons of coal. At present 164 million car miles are being run and a saving of 23 per cent. has been achieved in coal consumption at the power stations, as 80,000 less tons are burnt.

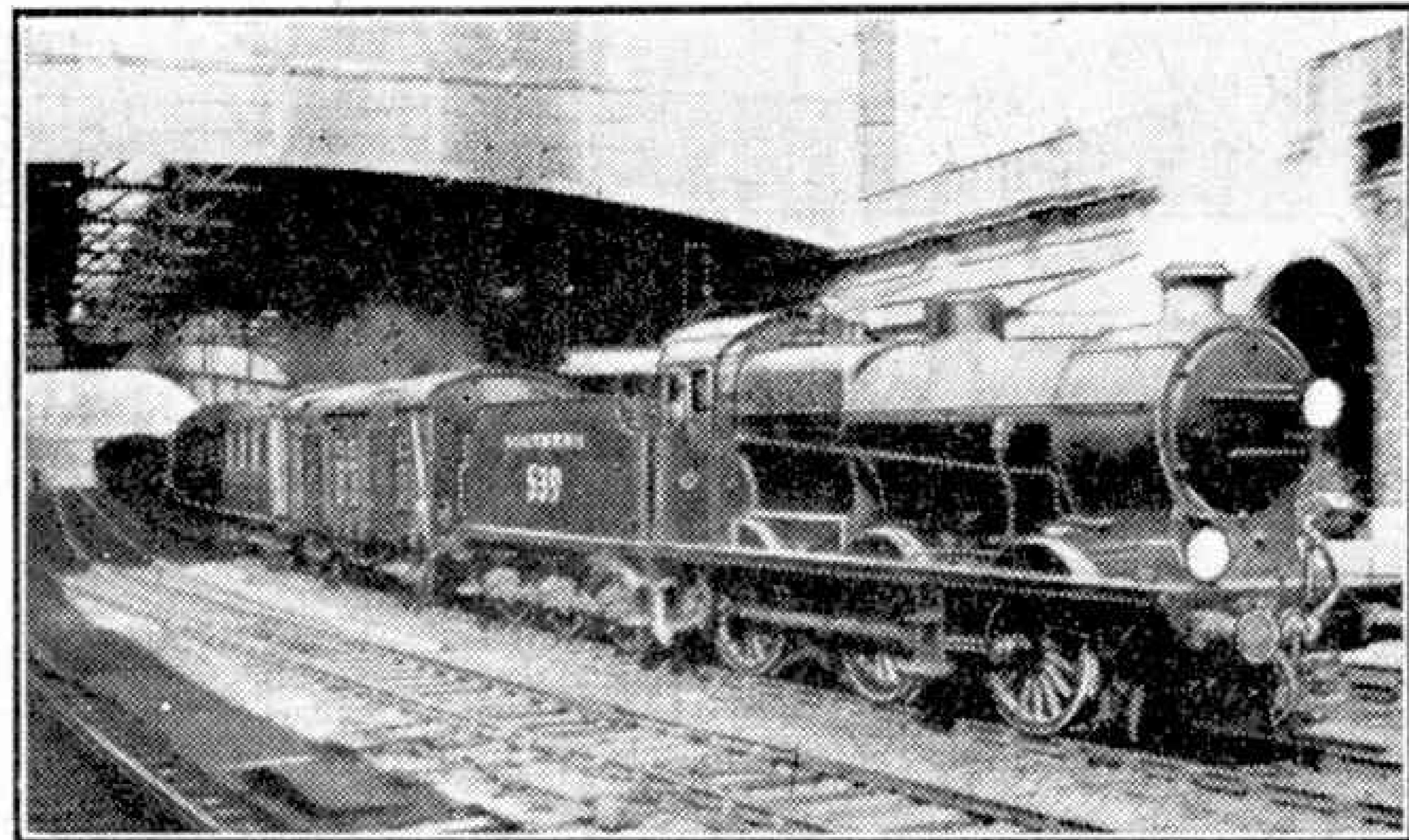
"Z" class 0-8-0 tanks Nos. 951, 955 and 956 have returned from Government loan in Scotland and were seen en route to the south, forming a curious special train on the East Coast route hauled by a former N.E.R. freight locomotive. These are powerful 3-cylinder shunting tank engines familiar in London and provincial marshalling yards on the S.R., built in 1929 with 4 ft. 8 in. driving wheels and 180 lb. per sq. in. boiler pressure.

There are several interesting points to note in connection with the "Q" class, introduced in 1938.

They were the first 0-6-0s to be produced by the Southern, although the grouping took effect in 1923, and as a matter of fact no engine of that wheel arrangement had been built for any of the main constituent companies of the S.R. since 1908. The "Q" class was the last design before retirement of Mr. R. E. L. Maunsell, who had been Chief Mechanical Engineer of the South Eastern and Chatham, and Southern Railways, since 1913. They are impressive looking engines of typical Maunsell appearance numbered 530-49, having 5 ft. 1 in. driving wheels, 200 lb. per sq. in. boiler pressure, cylinders of 19 in. diameter and 26 in. stroke, outside admission piston valves and a tractive effort of 26,157 lb., approximately equal to that of the S.R. 2-6-0 types. No. 531 is fitted with multiple-jet blast pipe and large chimney. They are Western Section locomotives and have been seen thereon working successfully on many varieties of goods, excursion and mixed traffic duties. Under war conditions they also operate a good deal on the Central Section from Redhill and Horsham sheds.

L.M.S. Locomotive Notes

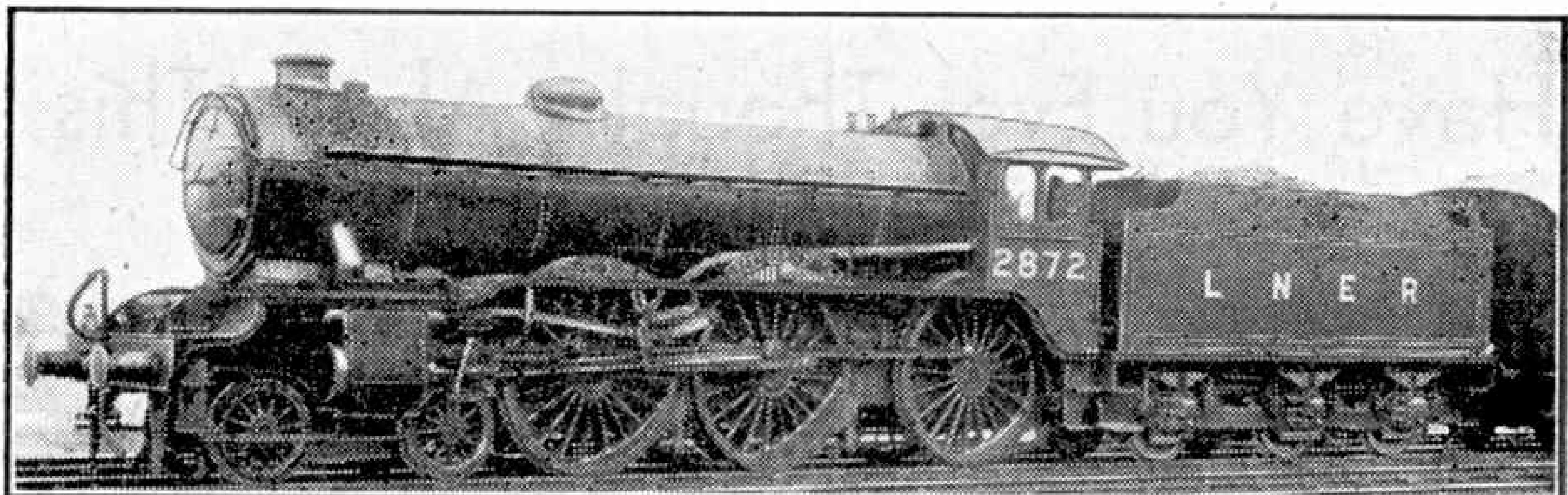
One of those classes of locomotive that seem to



S.R. "Q" Class No. 539 on an up relief train standing on the through track at Bournemouth Central. Photograph by G. O. P. Pearce.

"go on for ever" is the well known 18-inch 0-6-0 goods, introduced by the former L.N.W.R. in the early 1880's and developed to the extent of 310 engines by 1902. To distinguish them from the older coal engines with 17 in. cylinders and smaller driving wheels, these standard Webb engines became known as the "Eighteen Inches," or more popularly as "Cauliflowers," in rather flippant reference to the Company's coat of arms, which used to be carried on the centre driving wheel splasher over the curved running plate.

With coupled wheels only just over 5 ft. in diameter these tough little locomotives, which were contemporary with, and originally had the same boilers as the famous "Jumbo" 2-4-0s, have done a great deal of passenger and mixed traffic work in addition to long distance and local freight haulage throughout what is now the Western Division. They were the pioneer main line engines to be fitted with Joy's valve gear, a familiar feature on other L.N.W.R. designs later. To-day quite a number, provided with newer Belpaire boilers, are still taking a share in the war transport effort, although displaced by more modern, powerful types on the faster and longer distance duties. On account of the rapid construction of more standard "SF" 2-8-0s, which may need their running numbers in order to keep them in the various 8xxx series, the "Cauliflowers" are having 20,000 added to their numbers, which now range in the L.M.S. list from 8315 to 8622; 104 are believed to be still in service.



L.N.E.R. No. 2872 "West Ham United" of the "B17" class, named after professional football clubs. The locomotive is shown ready with an Eastern Section express.

Their power classification is "2F."

Many more of the Stanier type "SF" 2-8-0 freight engines mentioned above have been noted at work. Those built by the S.R. now go up to No. 8683; those constructed at Swindon by the G.W.R. are numbered 8400-8425 and upwards. Incidentally at the time of writing Nos. 8414 and 8427 are at the G.W.R. shed at Laira, Plymouth. Other new ones turned out from Crewe and Horwich are appearing numbered in the 83xx series. Nos. 8264-8285, built by outside firms, were W.D. locomotives, at first bearing 5xx and 6xx numbers. They are seen in many parts of the widespread L.M.S. system. Further class "5" 4-6-0 6 ft. mixed traffic engines are Nos. 5488-92, ex Derby Works to Scottish sheds.

The last rebuilt "Claughton" 4-6-0 No. 6004, now unnamed, but formerly "Princess Louise," worked up to Willesden in the London area during the autumn of 1943, one way on a parcel train, returning with goods. This may possibly prove to have been the farewell visit to London and the south of a representative of what, 25 years ago, was the largest and most powerful express type of the L.N.W. No. 6004 generally runs in the Liverpool and Crewe regions, and has even penetrated to Birkenhead.

The first withdrawal for scrapping has taken place of one of the former Highland Railway's last express engines of the "Clan" class, built in 1919 to the designs of Mr. C. Cumming. There were eight of these 4-6-0s, with outside cylinders 21 in. diameter with 26 in. stroke, Walschaerts gear, superheater and, in view of the steep gradients, 6 ft. driving wheels. They were constructed at the works of Hawthorn, Leslie and Co. Ltd. and have long raised framing in front of the low splashes, on the centre of which is painted

the name in large block type letters. The last of the batch, carrying the L.M.S. number 14769 and named "Clan Cameron," is the first to go.

A Driver and Fireman's Resourceful Bravery

Few passengers, if any, on a night mail to King's Cross recently, knew that only the prompt and courageous action of Driver Blunt and Fireman Page, of King's Cross, saved them from great danger. Most of them were asleep.

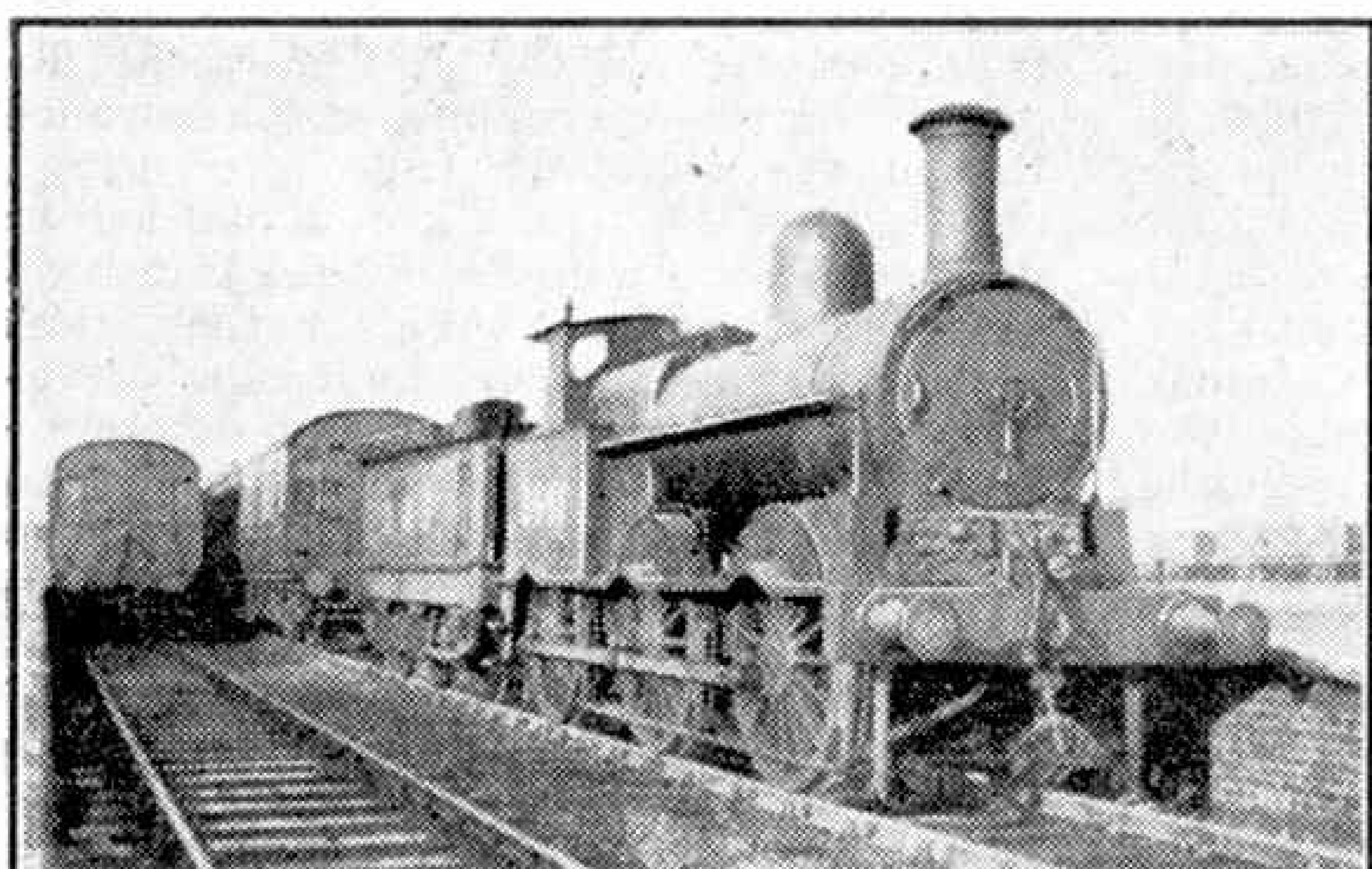
The crowded express had been stopped at a previous station in order that the train crew could be informed that a raid warning was in effect, and so was travelling slowly through a tunnel when the driver observed that the end of the tunnel was silhouetted in a dazzling white glare and that incendiary bombs were showering down. An instant's delay and the train would have been out in the open in danger of catching fire seriously, but Blunt applied his brakes and brought the train to a stand within the tunnel. Then, arming themselves with shovels from the engine, he and Page bravely walked forward into the open and regardless of the risk of explosion set about extinguishing many of the bombs, some of which had set the wooden sleepers alight. Having completed their task, the fireman telephoned to the nearest signal box briefly reporting the incident and saying that as no high explosive had dropped and the track appeared to be safe, they proposed proceeding cautiously towards King's Cross. This they did with a total additional loss of only 30 min.!

Driver Blunt, who is 57 years of age, is in the "top link" of express drivers. The signalmen on each side of the incident also played their parts with bravery and resource, in stopping other traffic and making prompt arrangements for the line to be examined in case other damage had occurred during the raid and barrage.

W.D. Engines

There are now literally hundreds of 2-8-0 wartime engines on loan to the British railways under the auspices of the Ministry of Supply. They are of two great classes, the British "Austerity" design numbered from 7000 to 7500, and the American ones, bearing numbers from 1600 to 24xx, both of which are still being developed. Six of the U.S. type have been working on the S.R. in the West of England, while sister locomotives are to be seen on many routes of the G.W.R., L.M.S. and L.N.E.R. systems. "Austerities" are nearly all allocated so far to the three companies last named.

It appears that the remarkable 2-10-0 British Government design, the appearance of which was reported in the March issue, is mainly for overseas service and we are informed that Nos. 3653-8, which were "run in" at Eastfield, L.N.E.R. shed, have already left there.



L.M.S. 0-6-0 No. 8441 at Willesden Junction. This is one of the ex-L.N.W.R. "Cauliflowers," rebuilt with Belpaire fire-box, referred to on the previous page. Photograph by W. P. Conolly.

Have You Ever Thought About This?

Why are Railway Rails Canted on Curves?

By O. S. Nock, B.Sc., A.M.I.Mech.E.

MANY years ago, when I was still a schoolboy and journeying home for the holidays, I was standing on Carnforth station. With me was a younger boy who, I noticed, was gazing intently at the rails adjacent to the sharply curving platform used by trains to and from the Furness line. Suddenly he turned to me and said: "Those rails are not level; if a train went fast round them I should think it would roll off against the wall." As a senior boy I replied with somewhat withering sarcasm: "That's just what would *not* happen; that rail is raised to prevent a train falling over *this* way"—we were standing on the outside of the curve. But my companion shot back the disconcerting question: "Why?" and thereby bowled me out—middle stump! It was several years later that I learned the reason, and here it is.

The First Law of Motion

The layout of railway curves is bound up with one of the great fundamentals of all engineering, Newton's First Law of Motion. According to this law all solid bodies either remain at rest, or move at a constant speed in a straight line, unless acted upon by some extraneous force. A train running along a straight track is being acted upon by a number of forces; the resistance of the air, and its own internal resistance (friction in the bearings and such like) are trying to stop it, while power developed by the locomotive overcomes those forces and maintains the required speed. But when it strikes a curve another force begins to act upon the train, otherwise, following the First Law of Motion, it would continue in a straight line. The wheels press hard against the outer rail, and the rails themselves, stoutly laid, resist the pressure and guide the wheels round the curve. If the two rails are level the whole of the force necessary to guide the train must be given by the outer rail.

But the force necessary to guide the train rises in proportion to the square of the speed, so that at 50 m.p.h. it is 16 times as great as at 15 m.p.h. Even if it were practicable to design permanent way capable of resisting such pressure, the motion of the train, with the wheels

grinding against the outer rail, would be most unpleasant. By raising the outer rail—superelevating is the technical term—the locomotive and carriages have a tendency to slide down towards the inner rail. When a train is standing still on such a curve all the side thrust is taken by the inner rail; but with increase of speed this side thrust on the inner rail becomes less and less until a speed is reached at which there is no side thrust on either rail, and the train glides smoothly round the curve.

For any particular amount of superelevation there is only one speed at which the lateral forces on the rails vanish altogether, and in actual practice curves are canted to suit the maximum speeds that are likely to occur in the particular place. Some readers will no doubt have travelled by trains stopping at Penrith, on the L.M.S. main line. The curve there is quite a sharp one, and the "Royal Scot" and other famous expresses go through at well over 60 m.p.h.; but the sensation of getting into a carriage that is standing on that curve is a very queer one.

Transition Curves

Earlier in this short article I used the expression "it strikes a curve." Obviously the outer rail cannot suddenly be raised to the full amount of superelevation, and yet if the canting were introduced gradually there would be a very severe lurch as the train came on to the curved track. To provide for smooth running at the entrance to curves, what are called "transition curves" are laid in. The actual curve itself is an arc of a circle, but the transition curve is a somewhat complex mathematical path having a gradually increasing curvature. The engineers must first determine in what distance they wish to obtain the full amount of superelevation for the curve proper; then if the maximum speed is to be say, 80 m.p.h., for every inch of superelevation they can calculate what radius of curve must be laid for there to be no side thrust on the rails. When the straight track ends, and the transition curve begins, there is no superelevation, and so at the beginning the transition curve is made very flat; (Continued on page 142)

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

Gold From Wales

It is interesting to know that gold has been found in Wales, near the small village of Bont-ddu, which is near Dolgelley, Merionethshire. One of the illustrations on this page shows the gold mine works.

The discovery of some £60,000 worth of the metal about 80 years ago led to the opening of many mines in Merionethshire. The Welsh company carried on for about 20 years and the mine payed good dividends. When the gold seemed to be petering out, it was sold to a syndicate that employed 300 miners working in shifts of 8 hours each, and the mine payed well for 30 years.

The mountain where gold is found at Bont-ddu is called Clogau. The gold is actually found in pockets and when the pockets seemed to be getting exhausted the company closed down. Since then, and during the last 30 years, five separate individual attempts have been made to find the gold in paying quantities, but all ended in failure, and so gold mining in Wales ceased, for the time being at least. That there is more gold in the mountain seems certain and someone no doubt will have another try for it. It is an old saying of miners that "Gold is where you find it."

J. COWPERTWAIT (Leicester).

Tree to Hold 12 People

At Crowhurst, Surrey, stands the enormous yew tree shown in the accompanying photograph. It is said to be 1,000 years old, and the trunk is entirely hollow. In the year 1820 the interior was fitted with a round table and a bench capable of seating 12. The door was fitted at the same time, and is kept bolted and padlocked.

S. S. LAWRENCE (Croydon).

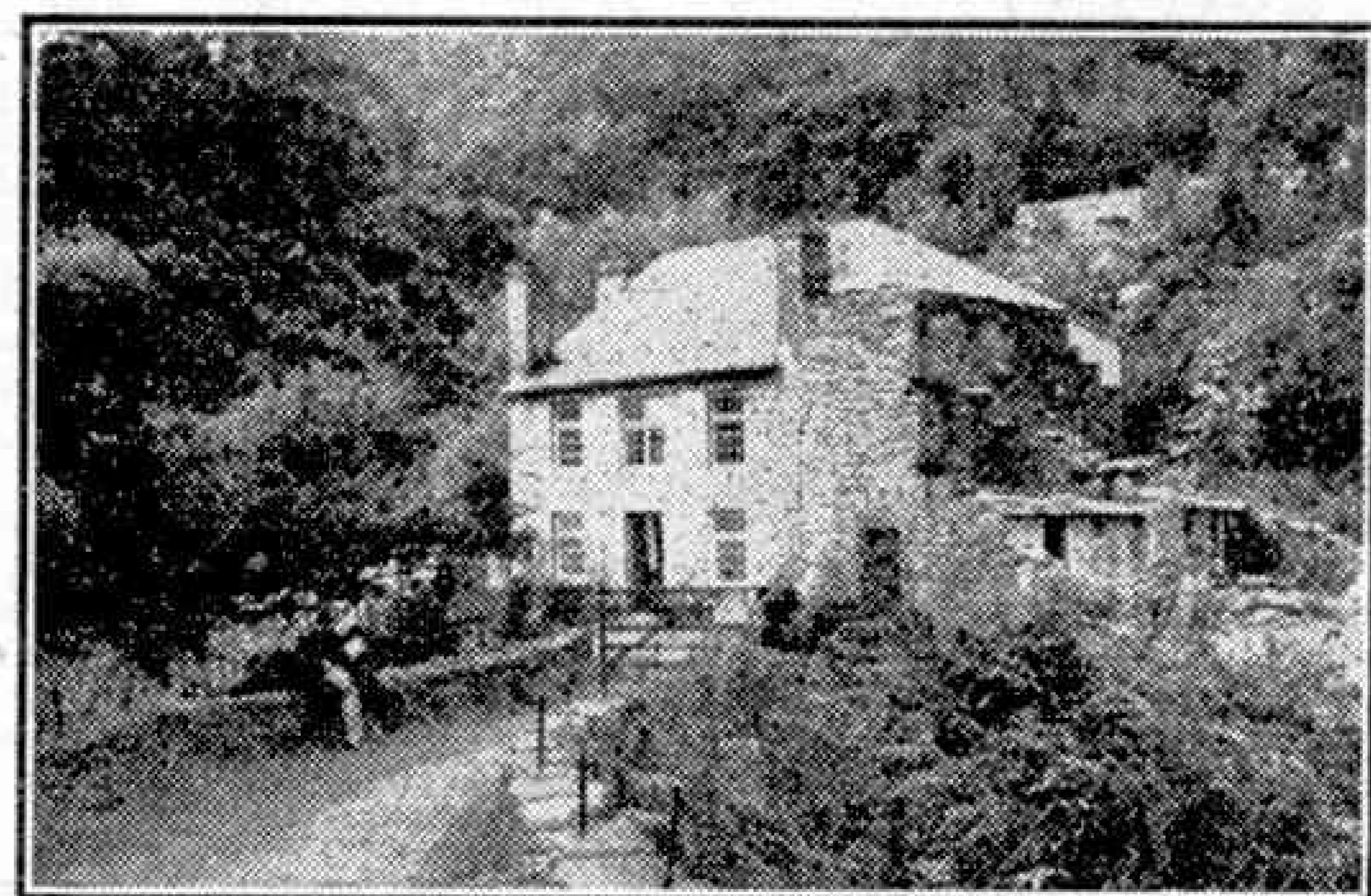
A Unique Light Railway

I recently travelled on the Kelvedon and Follesbury Light Railway, L.N.E.R. There is little passenger traffic on this line and the whole effect is like that of a miniature railway. To reach it one follows a long subway from the main station to Kelvedon Low Level, where the branch train awaits the passenger. The platform is only a foot above ground, and so the carriages are equipped with steps and have a platform at each end. The engine, an 0-6-0 tank, is stabled in a small engine shed at Kelvedon. There are two carriages, one a four-wheeler and the other a bogey-coach lit by gas.

On the journey the train halts while the fireman alights from his place in the engine cab to open the level crossing gates. The train then proceeds, with the fireman again on board, and stops a second time to allow the guard to

shut the gates and rejoin the train. Most crossings are unprotected, so a signal of three whistles and a reduction in speed are rigidly enforced.

About 2½ miles along the journey the guard-conductor asks if he can see your ticket. You murmur "No," whereupon he inquires where you want to go and if you want a single or a return



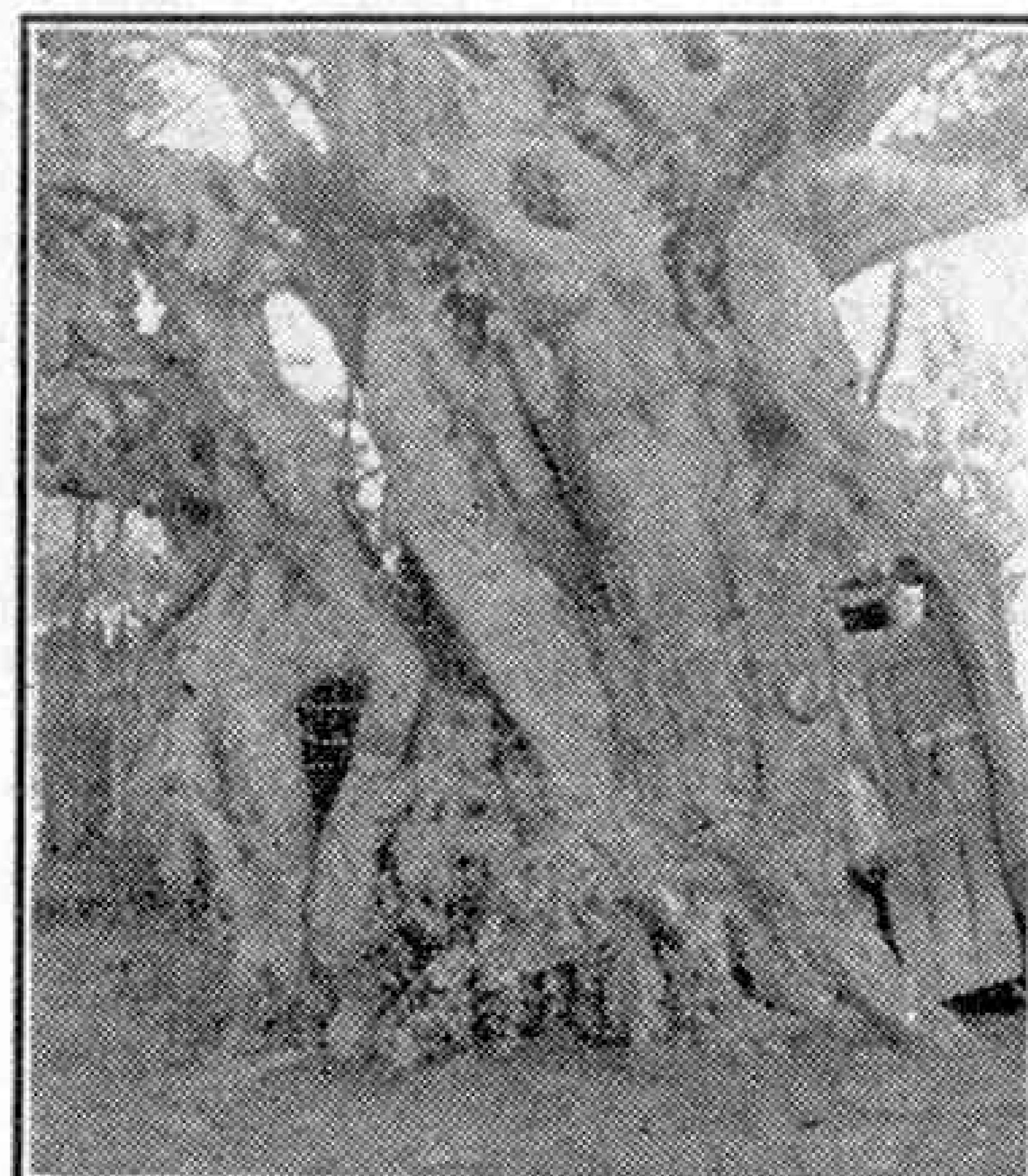
The gold mine works at Bont-ddu, Merionethshire. Photograph by J. Cowpertwait, Leicester.

ticket. "A return to Follesbury, please," you reply, and he opens the partition which separates his sanctum from the remainder of the carriage. Here he dons his regalia of office, a ticket punch, and arms himself with tickets and a pencil. On production of your fare he gives you a ticket punched in a square that bears the name of the destination.

The source of most traffic is a jam factory at Tiptree that has a private siding, where an average of eight wagons are handled daily. The 3.15 p.m. mixed train takes 65 min. to cover the 8½ miles route, stopping if necessary at all sidings. The quickest time for completing this journey is 31 min. When there is no goods traffic a timetable has to be worked to and the train stands in a station while time rolls by. There are two brake vans, one marked Kelvedon and the other Follesbury. The spur joining the main line is controlled from Kelvedon main signal-box, other points and signals being controlled from a separate ground frame.

The whole line is worked with a small staff, even in peacetime, and on a one-engine-in-steam system. It gave me the impression of a unique miniature railway.

R. D. BARRETT-LENNARD (Braintree).



A room in a tree. This hollow yew contains a bench capable of seating 12. Photograph by S. S. Lawrence, Croydon.

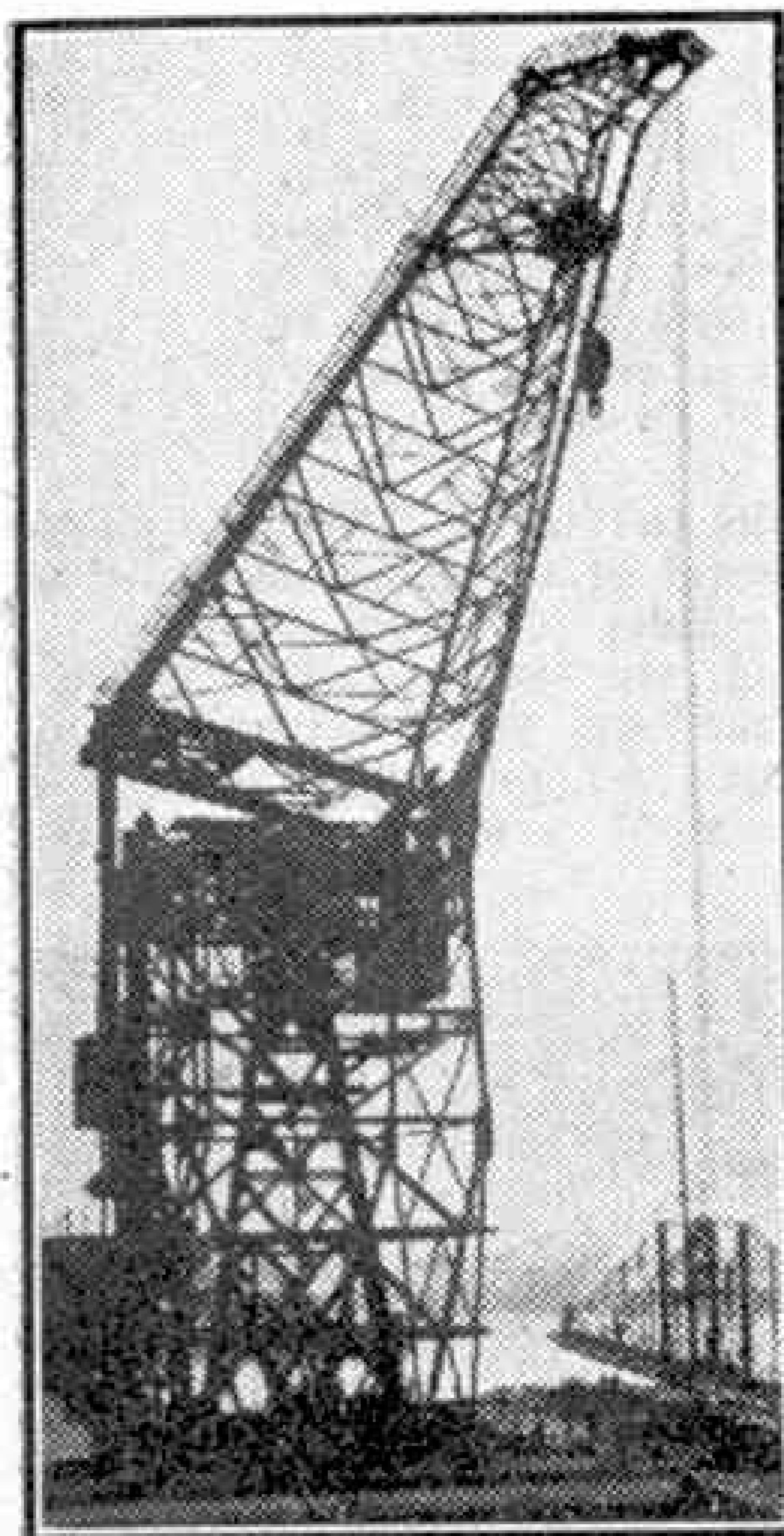


illustration on this page.

The difficulty facing the engineers was the lowering of the gantry crane to the ground, as the repairs and overhaul necessary could not be carried out on the high level at which the crane normally operated. After discussion it was finally decided that the safest and quickest method would be to call in the assistance of a huge floating crane which is used by the same Yard for installing machinery in ships at the fitting out quays.

This steel monster is seen on the left-hand side of the lower illustration, and its huge size can be gathered from the upper photograph. It is mounted on a steel barge which measures 159 ft. by 86 ft. and which draws nearly 7 ft. of water. It is capable of lifting 150 tons to a height of 178 ft., and 50 tons to a height of 216 ft. The 50-ton hook has a maximum outreach of 100 ft. from the barge, while the 150-ton hook can lift at a distance of 60 ft. from the barge. The height from sea level to the top of the crane is 230 ft. The driver's cab is situated just below the point of attachment of the jib, and from here the operator has a clear view of what he is lifting. It is one of the largest floating cranes in the world, although it has seen nearly 40 years' service.

As already mentioned the floating crane has two hooks, one higher on the jib than the other. For this particular job it was necessary to use the smaller 50-ton hook in order to get the necessary height, as it is 185 ft. from water level to the top of the travelling 5-ton gantry crane when in position.

When the great day arrived, all preliminary preparations had been completed. The gantry had been lengthened slightly to enable the 5-ton travelling crane to be run out far enough to come within the reach of the big floating crane; all but a few of the connections in the gantry crane had been removed, and the stage set. Three fussy little tugs, their safety valves blowing jets of steam, indicating that their boilers were at full pressure, came slowly up the river towing their majestic charge to its destination.

An Unusual Crane Lift

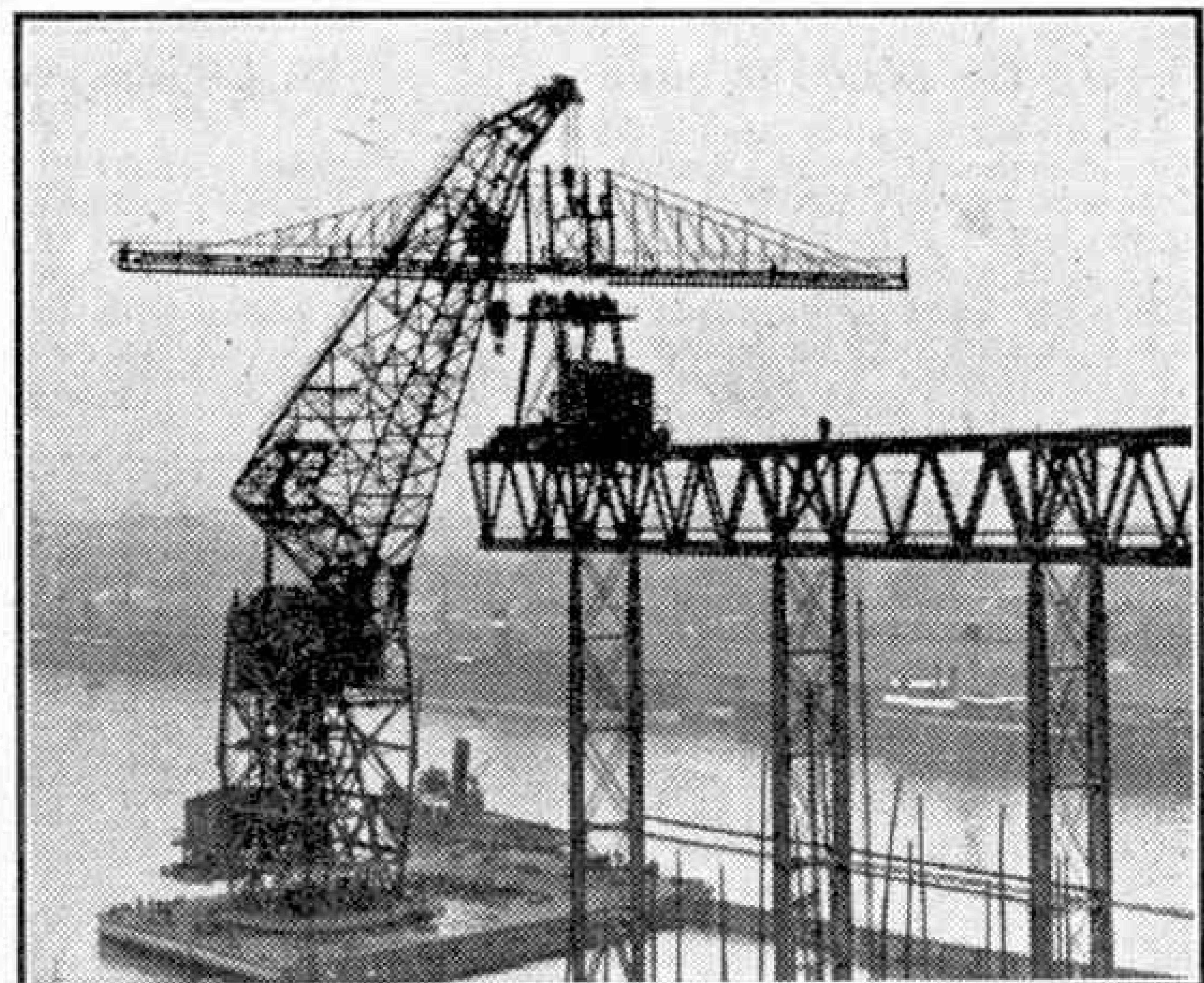
By Denis Rebbeck, M.A. (Cantab.), A.M.I.Mech.E.

AN interesting problem faced the plant engineers in a British shipyard some time ago, when it became necessary to completely overhaul a large 5-ton travelling crane which runs on an 18 ft. wide track carried on a large steel gantry, at a height of 127 ft. above water level. This gantry is situated between two building berths, which it serves; and its general construction is seen on the right-hand side of the lower

The floating crane was eventually made fast by steel hawsers on the site, and the difficult task of slinging the gantry crane was commenced. This tricky operation completed, the remaining connections between the jib of the gantry crane and its lower part were broken by a large squad of workmen, and all was ready for the lift. River traffic was halted in case the waves from passing steamers should make the floating crane surge while lifting, and after a final anxious check had been taken by the plant engineer, the signal to hoist was given, and the jib of the gantry crane was gently lifted into the air.

The lower photograph shows the 230 ft. jib lifted some 10 ft. from its base. Note the squad of workmen, their part of the job completed, watching the operation proceed from their point of vantage, while a few of their lucky comrades can be seen on the jib itself in mid-air, keeping an eye on the lifting tackle. The gantry crane's long jib having been lifted and swung clear, it was then lowered gradually until it came to rest on a jetty; and the upper photograph shows the jib almost landed on the jetty. The workmen wiped beads of perspiration from their brows, gave each other a brief nod of approval, and shortly afterwards the signal was given to the tug captains to quietly tow their valuable charge back down the river to its normal work.

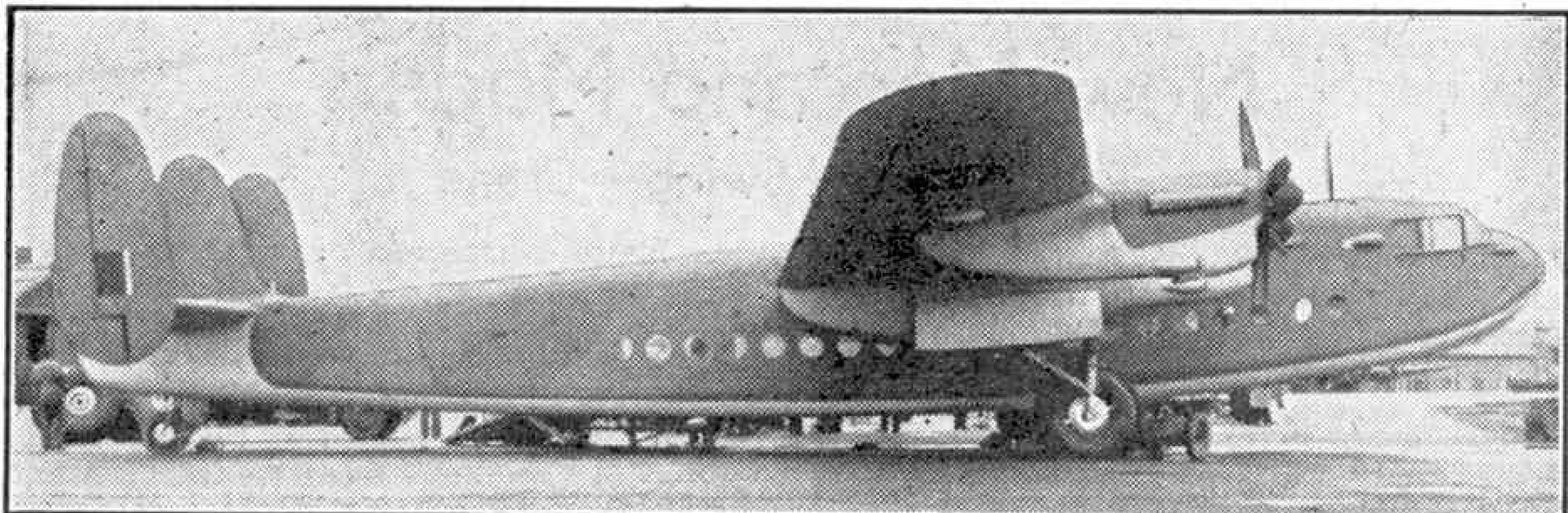
Thus a ticklish job was safely completed by the use of ingenuity and careful planning, proving once again that the British engineer is ready to tackle anything



Giant floating crane lifting gantry crane from its lofty track for overhaul.

that he may be called upon to do. There is certainly no such word as "can't" to be found in the vocabulary of engineering.

After being completely overhauled, all corroded members replaced, and the whole structure covered with a coat of fine new paint, the travelling crane was eventually lifted back on to its high perch by the same means as it had been lowered, and was shortly back in service. Every plant engineer has to face many strange problems in his daily work, but few could demand more care and attention than this particular operation.



An Avro "York" of Transport Command, R.A.F. Photograph "The Aeroplane" copyright.

The Avro "York" Transport

IN these days of intense production of heavy bombers and fast fighters to speed up the destruction of the enemy, it is encouraging to learn that the British aircraft industry can find time to prepare for the big part that Britain will play in post-war commercial aviation. This preparation includes the construction of up-to-date large transport aircraft which will be available for service on post-war long-distance air routes immediately these can be resumed, and which in the meantime can be usefully employed on wartime air transport work.

The first of several types of large aircraft now in production for this purpose is the Avro "York," shown in the accompanying photographs. It is being supplied to British Overseas Airways, and the first one delivered to the Corporation is now in service. The "York" is also being used by Transport Command, R.A.F., and one of these machines recently completed a routine journey to Cairo over the regular 3,600 miles route in 18 hrs. flying time. It carried eight passengers and freight, and made one scheduled stop of 1 hr. on the way.

The "York" has been referred to loosely in the Press as the civil version of the "Lancaster" heavy bomber, but actually it is a new design. What Mr. Roy Chadwick, the designer of both aircraft, has done is to incorporate in the "York" as many "Lancaster" parts as practicable, so as to reduce the time required to design the new machine and to facilitate its production. For example, the wings and the tail unit of the first batch of "Yorks" are identical with those of the "Lancaster"—the latest "Yorks" have a central fin added to the tail unit. This use of "Lancaster" parts for the new transport machine has reduced production costs and time.

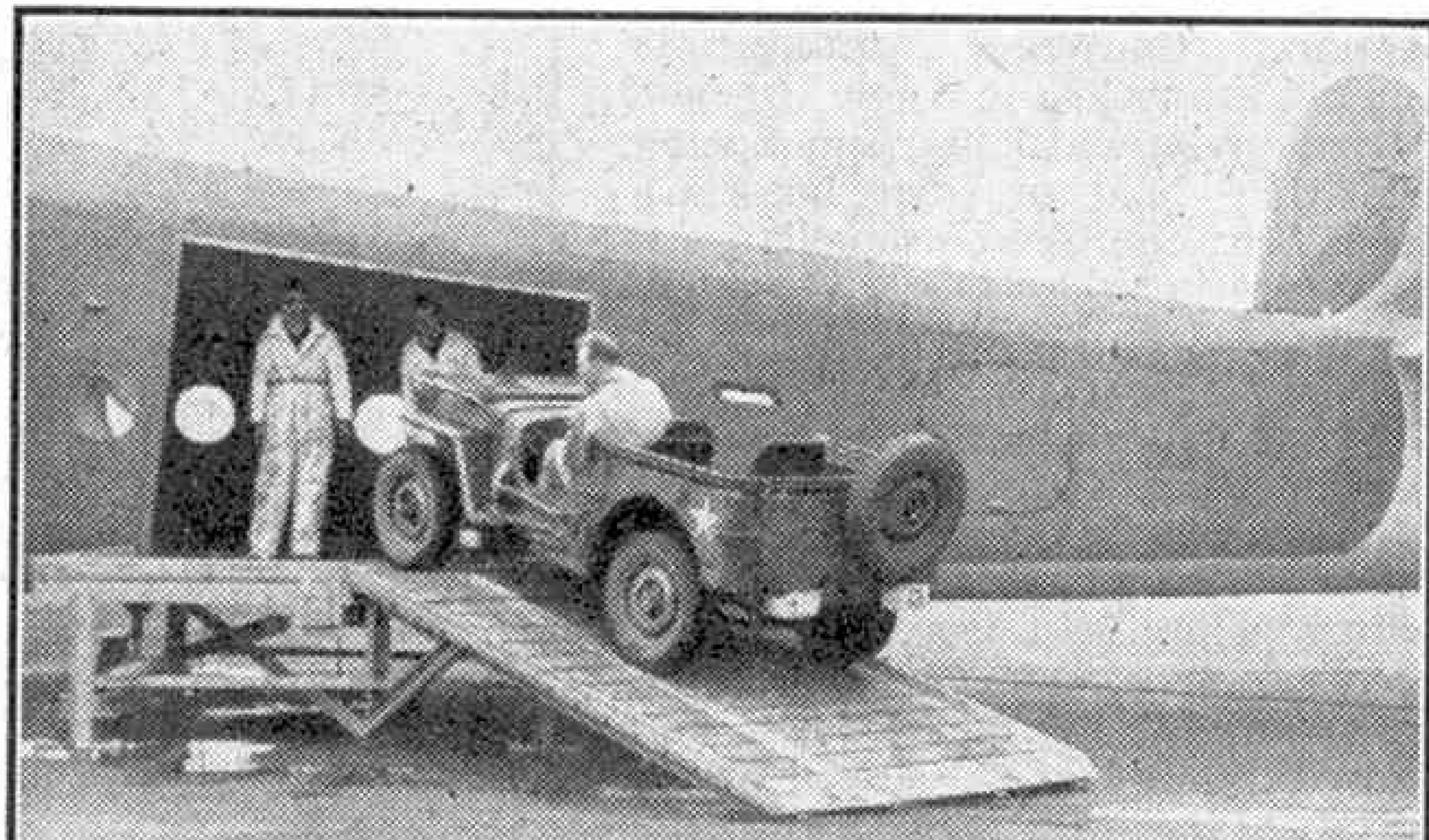
The "York" is designed to meet the present need for a transport aircraft adaptable for use as a freight or a passenger carrier. Indeed, this convertibility was an important condition of the specification to which Mr. Chadwick worked, and the "York" can be converted from freight to passenger transport, or vice versa, within 24 hrs. Utility rather than grace is

the keynote of the design, and the deep flat-sided fuselage gives an impression of great capacity that is confirmed when one enters it. On flights of up to 500 miles or so the machine can carry up to 10½ tons of payload. The wide, unobstructed stowage space is large enough to accommodate four Jeeps, or 15 "Lancaster" undercarriage wheels and tyres, or a variety of other cargo such as aero engines, tools, crates of airscrew blades, food supplies, and so on.

As a passenger carrier the "York" is said to have room for 56 passengers on flights of up to 1,000 miles, but it is probable that the number carried will be less, in the interests of comfortable travel.

The control room in the blunt nose of the "York" is equipped with dual controls and instruments, and the two pilots sit side by side. The wireless operator sits on the port side of the room, behind the first pilot and about 4 ft. below him, and the navigator has a corresponding position behind the second pilot, on the starboard side. There is an astra-dome directly over the navigator's position, so that he can conveniently take his readings.

The "York" can be fitted with either Rolls-Royce "Merlin" or Bristol "Hercules" engines, as can the "Lancaster." Performance details are secret, beyond the fact that the machine has a top speed of over 300 m.p.h.



Driving a Jeep aboard. The low fuselage greatly facilitates the loading of cargo. Photograph "The Aeroplane" copyright.

New Meccano Models

Flying Boat—Swing—Crane

THE simple but realistic model flying boat shown in Fig. 1 provides an interesting change from the more usual type of model-building. The fuselage of

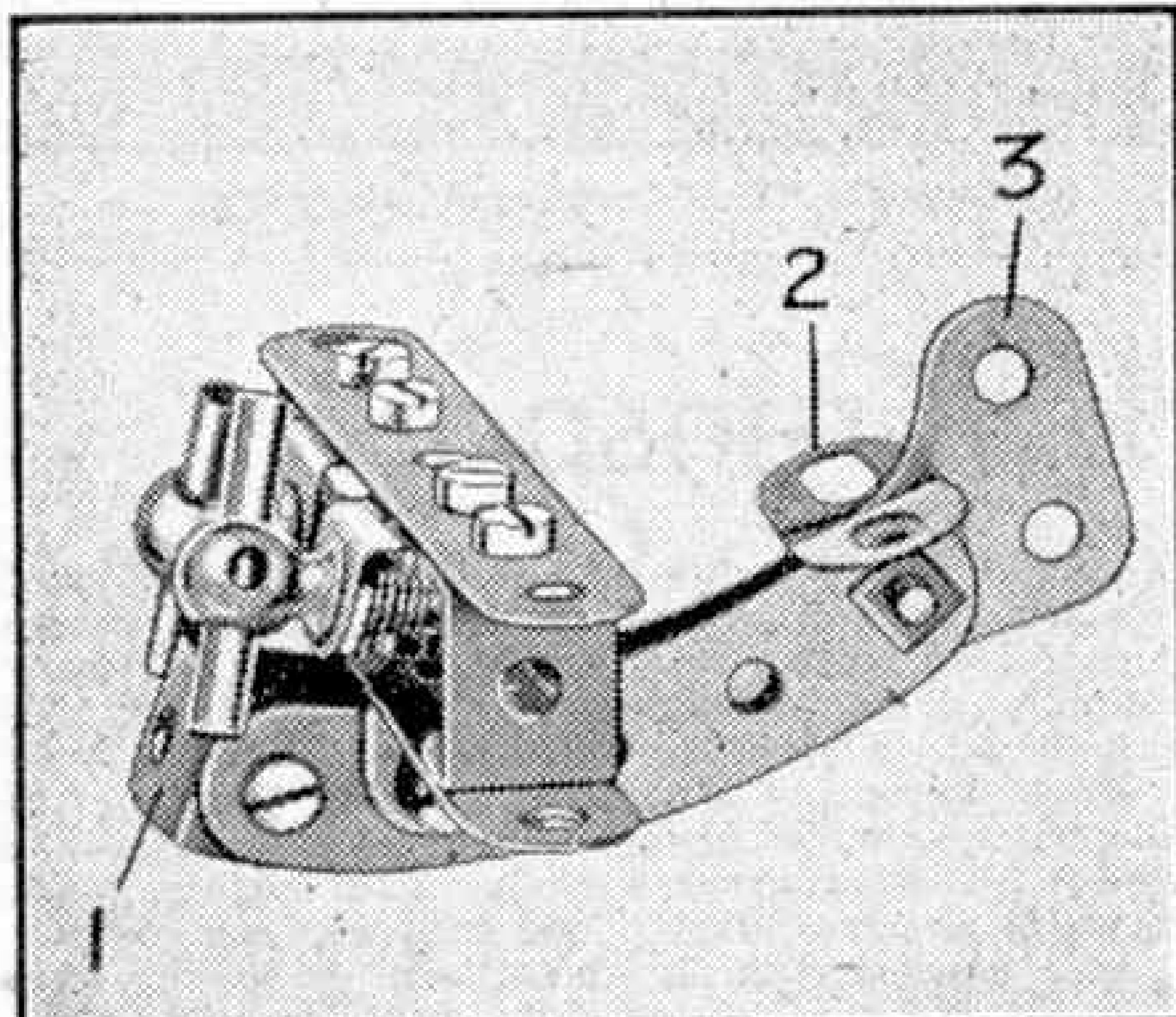


Fig. 1. A simple but remarkably effective flying boat model.

the model consists of two $2\frac{1}{2}$ " Curved Strips. These are spaced apart at the nose by means of a Double Bracket 1, and at the tail they are bolted together with two Angle Brackets 2 and a Corner Bracket 3 held on the Bolt between them. The wings are $3\frac{1}{2}$ " Strips, the lower one of which is fixed to the sides of the fuselage by Angle Brackets. The upper wing is spaced from the lower one by means of two Double Brackets. The Handrail Couplings forming the engines are locked in Angle Brackets bolted underneath the upper wing, and they hold in their bosses 1" Rods that represent propellers.

Parts required to build model Flying Boat: 2 of No. 3; 3 of No. 11; 6 of No. 12; 2 of No. 18b; 12 of No. 37a; 12 of No. 37b; 1 of No. 133a; 2 of No. 136.

Fig. 2 shows a simple lever-driven model swing that is easy to build. The swing is based on actual swings operated from an outside source, which generally takes the form of another person pulling on ropes. The operator in the model is connected to a $2\frac{1}{2}\times 1\frac{1}{2}$ " Flanged Plate 1 forming the operating lever, and his arms are connected by lengths of Cord to Cranks mounted on the shaft to which the swing is pivoted.

The figure is attached by means of Hinges 2 to the base, which is formed from two $5\frac{1}{2}\times 2\frac{1}{2}$ " Flanged Plates joined by a $2\frac{1}{2}\times 2\frac{1}{2}$ " Flat Plate and bolted to $12\frac{1}{2}$ " Strips.

The swing is formed from two $9\frac{1}{2}$ " Strips bolted to Couplings fixed on the Rod and fitted at their lower ends to a $1\frac{1}{2}\times 1\frac{1}{2}$ " Double Angle Strip. The occupant of the swing is formed from a Flat Trunnion, fitted by means of a Flat Bracket with a 1" loose Pulley representing his head, and his arms are $1\frac{1}{2}\times \frac{1}{2}$ " Angle Brackets. His legs are 1" Reversed Angle Brackets. On operating the Plate 1 as shown in the illustration the operator tends to pull the swing towards him and realistically draws himself back at the same time. On releasing pressure on the Plate after the swing has gained a good impetus the arms, which are pivotally connected to the body of the operator, swing up and down, and they appear to take up the slack cord while he rests between the intervals of pulling.

Parts required to build model Swing: 6 of No. 1; 2 of No. 1a; 4 of No. 2; 4 of No. 4; 2 of No. 6; 2 of No. 6a; 2 of No. 10; 6 of No. 12; 2 of No. 12b; 1 of No. 16; 2 of No. 22a; 6 of No. 37a; 56 of No. 37b; 14 of No. 38; 1 of No. 40; 1 of No. 48; 1 of No. 48a; 1 of No. 51; 2 of No. 52; 2 of No. 59; 2 of No. 62; 2 of No. 63; 1 of No. 72; 2 of No. 111a; 2 of No. 111c; 2 of No. 114; 2 of No. 124; 3 of No. 126a.

The base of the model Dockside Crane shown in Fig. 3, consists of two $9\frac{1}{2}$ " Angle Girders, to which are bolted Flat Plates

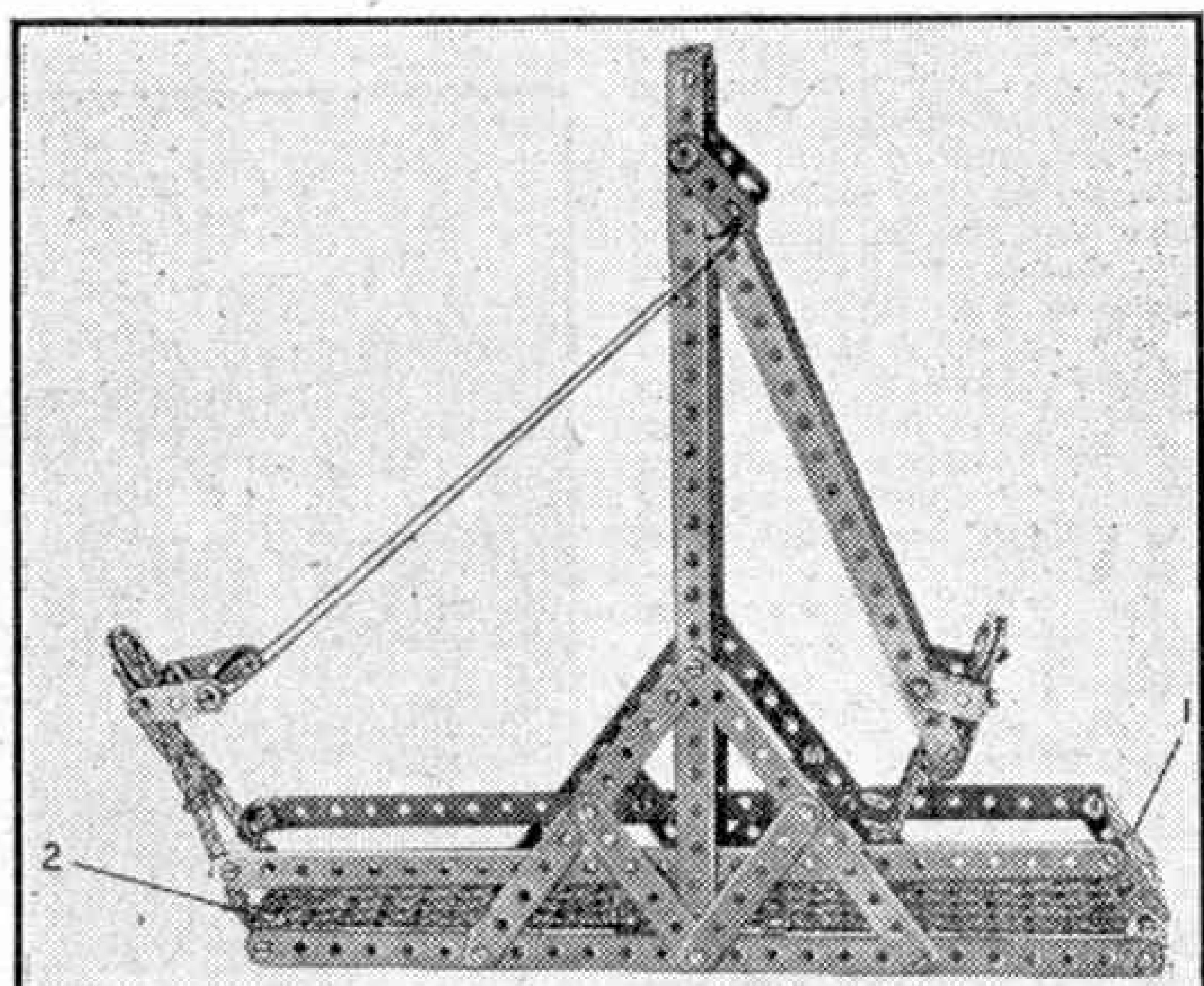


Fig. 2. A lever-driven swing model that is easy to build and realistic in action.

and Flexible Plates as shown. The tower is formed from four $5\frac{1}{2}$ " Strips bolted at their lower ends to $2\frac{1}{2}$ " Double Angle Strips fixed at the base. At their upper ends the Strips are attached to $\frac{1}{2}'' \times \frac{1}{2}''$ Angle Brackets bolted to a 3" Pulley Wheel, which forms the top of the tower and carries the swivelling jib. Across one pair of $5\frac{1}{2}$ " Strips a $2\frac{1}{2}'' \times 1''$ Double Angle Strip 1 is bolted and this serves as a bearing for the Rod 2, on which the jib pivots. This Rod passes also through the boss of the 3" Pulley Wheel and carries a Pinion 10 in the position shown.

The jib is constructed as follows. The upper side members are $12\frac{1}{2}$ " Angle Girders and at their front ends they are connected to the lower side members by means of two Flat Trunnions 3. They are spaced apart by a $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip. The jib-head Pulley is carried freely on a Rod 4 held in the Flat Trunnions by Collars. The lower side Angle Girders are extended at their rear ends by means of a $1\frac{1}{2}$ " Angle Girder 5 and $2\frac{1}{2}$ " Strips 6, which are arranged as shown. At the rear ends the upper side members are spaced apart by a $1\frac{1}{2}$ " Double Angle Strip. A short Rod 7 is mounted in holes in the upper Angle Girders of the jib and carries a Bush Wheel fitted with a Threaded Pin that forms a handle. The Rod serves as a winding barrel for the load hoisting Cord.

The jib is fixed on the upper end of Rod 2 by passing the Rod 2 through the

boss of a Double Arm Crank bolted across the $1\frac{1}{2}$ " Angle Girders of the jib. The set screw in the Crank is tightened to grip the Rod.

The swivelling movement of the jib is brought about by turning the handwheel

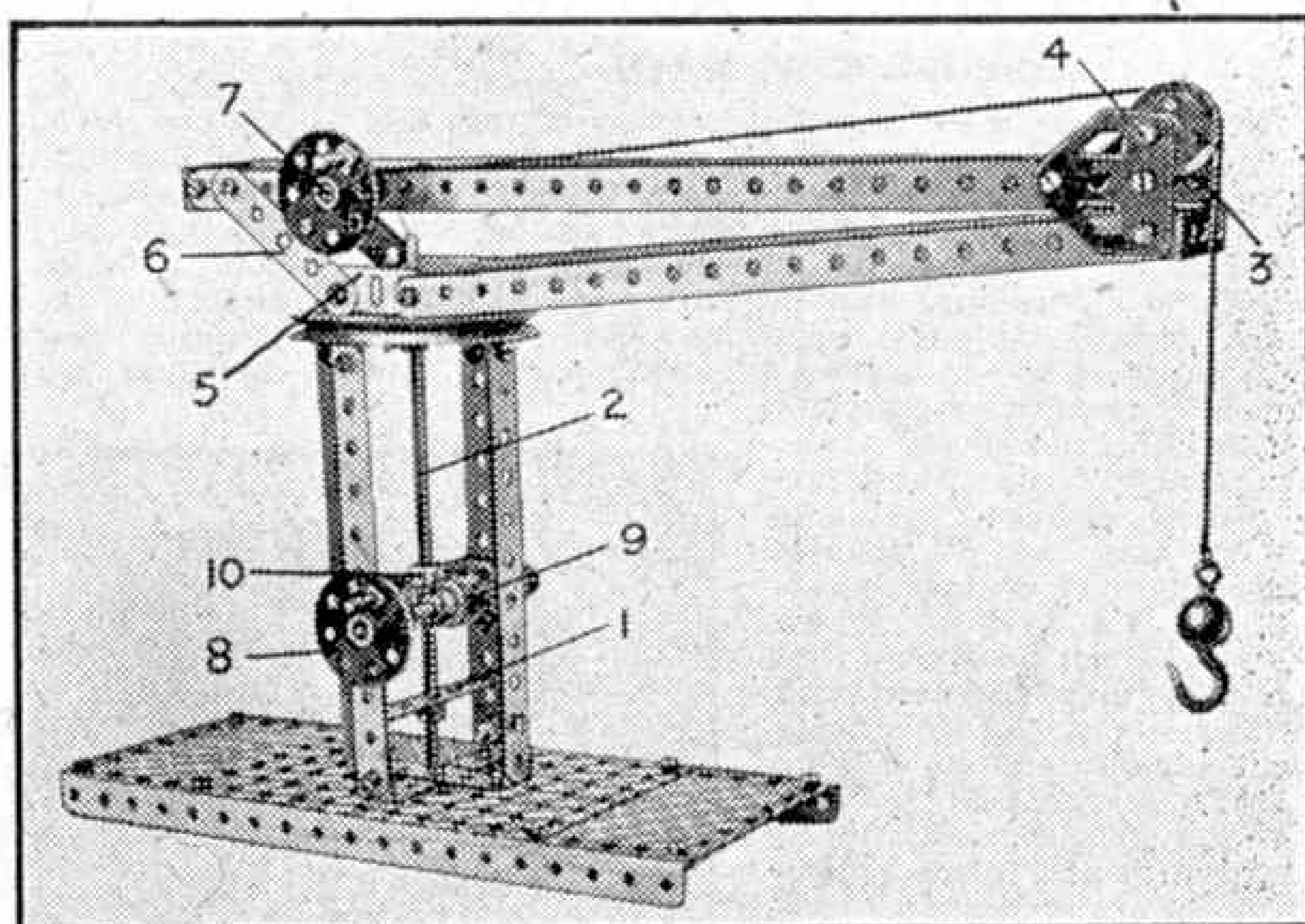


Fig. 3. More effective simplicity. A well-designed Meccano dockside crane.

formed by the Bush Wheel 8. This Bush Wheel is fixed on a Rod that carries also a Worm 9, which engages a Pinion fixed on the Rod 2. The rod of the Bush Wheel 8 is journalled in the arms of a $2\frac{1}{2}'' \times 1''$ Double Angle Strip bolted to the $5\frac{1}{2}$ " Strips as shown.

Parts required to build model Dockside Crane:
4 of No. 2; 2 of No. 5; 2 of No. 8; 2 of No. 8a; 4 of No. 12; 1 of No. 14; 1 of No. 16; 1 of No. 16a; 1 of No. 17; 2 of No. 24; 1 of No. 26; 1 of No. 22a; 1 of No. 27b; 1 of No. 32; 2 of No. 35; 41 of No. 37a; 41 of No. 37b; 2 of No. 9f; 1 of No. 47; 2 of No. 48; 1 of No. 19b; 3 of No. 48a; 1 of No. 52a; 2 of No. 59; 2 of No. 155; 2 of No. 126a; 1 of No. 176; 2 of No. 190a.

Prizes for Meccano Fun and Games

There are many uses to which Meccano Parts can be put apart from that of constructing ordinary mechanical models, such as cranes, motor vehicles and other engineering devices. For example, it is possible to build with Meccano many different kinds of mechanical games and amusement devices, such as skittle boards, bowling alleys, designing machines, electric roulettes, bagatelle boards, and so on. In addition to these, many different types of amusing "puzzles" and "mystery" models can be formed with the parts, and some examples of these have been illustrated in the "M.M."

Model making of this kind provides good fun, and there is plenty of scope for the exercise of ingenuity. This month therefore we are offering cash prizes for the most interesting models of amusement devices, mechanical games, puzzles or "mystery" gadgets of any kind, built entirely from Meccano Parts. Any number of Parts may be used, and a Clockwork or

Electric Motor may be incorporated.

The competition is open to readers of all ages and will be divided into two Sections, A for readers over 12 years of age and B for readers under 12 years of age. In each Section, there will be a First Prize consisting of a Cheque for £2/2/- and Second and Third Prizes consisting of Cheques for £1/1/- and 10/6 each respectively. A number of consolation awards of Postal Orders for 5/- will also be presented in each Section.

Competitors should note that the actual model must not be sent. All that is required is a photograph or a good drawing.

The sender's age, name and address must be written on the back of the photograph or drawing, and this should then be sealed in an envelope addressed: "Games Competition, Meccano Ltd., Binn's Road, Liverpool 13." Entries must be posted in time to reach Liverpool on or before 31st May next.



Club and Branch News



WITH THE SECRETARY

LOOKING BOTH WAYS

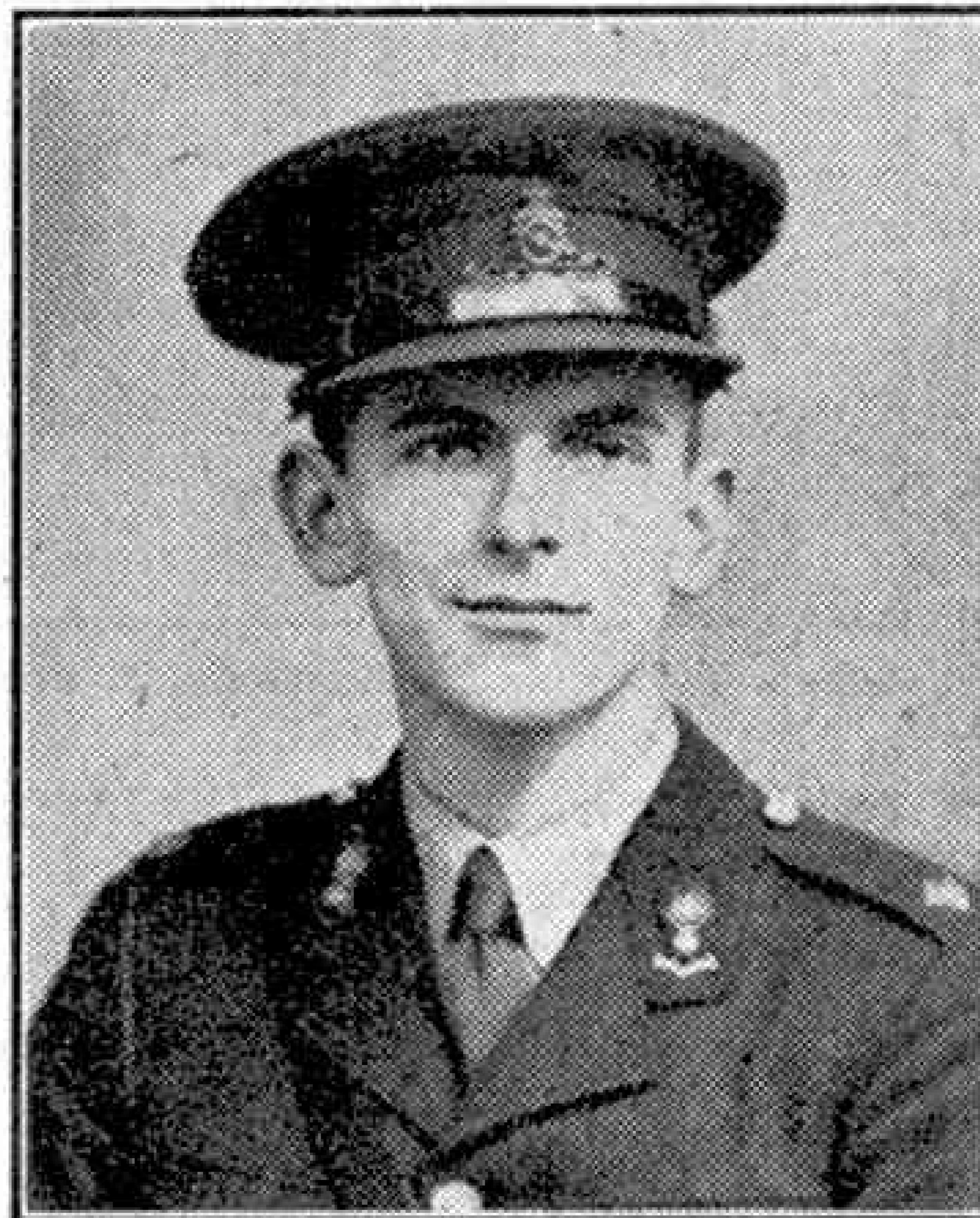
This is a time when Club Leaders and officials find themselves looking in two directions. Glancing backward, they have the Winter Sessions to review and to bring to a suitable end. Model-building Competitions are to be wound up, and marks for the Session to be reckoned up and prizes awarded. Then comes one of the most important features of the Club programme—a meeting at which parents and friends of members are present to see what has been done. In peacetime an Exhibition is usually arranged. A large display may not be possible nowadays, but an open meeting can be held to which supporters can be invited. At this they may be entertained in some way, by something approaching a concert if there is sufficient talent in the Club, and light refreshments can be arranged to add to the general friendliness and comfort.

A model display is advisable, whatever else is arranged, and prizes earned during the Session should be presented, by the President or the Leader, or perhaps by some prominent visitor. These awards should include Merit Medallions, and Leaders who have not yet sent me nominations for the Session just closed should do so at once.

The end of one Session is only the prelude to another, and a final meeting such as I have described gives a good opportunity for outlining the programme of the coming outdoor Sessions. I dealt with this briefly last month, and wish now only to point out that Club room work should not be abandoned altogether during Spring and Summer. This applies particularly to the present time. There is a revival of activity in Clubs generally, and the indoor Sessions of next Winter promise to be more productive than those of the past few years. Careful planning ahead is essential, and the work of the Summer Sessions should be regarded as part of the preparation. Improvements to the Club room should be planned and carried out as far as possible. If such matters as these are left to the Winter Session they are apt to hinder the pursuit of model-building and other hobbies. Stocks of all materials too could be overhauled and replenished as far as possible. This is work for dull days, and in our average Summer there should be plenty of these to allow much useful work to be carried out.

PROPOSED CLUBS

LIMERICK—Mr. T. Bourke, 73, St. Munchin Street, Mary's Park, Limerick.
 WETHERBY—Mr. E. Jenkinson, 2, Ashfield, Wetherby.
 MANORBIER—Mr. G. H. Lewis, Norton Cottage, Manorbier, Tenby.
 BIRMINGHAM—Mr. B. Cantillon, 49, Mill Lane, Northfield, Birmingham 31.



Lt. A. Tawn is Deputy Leader of the Hornsea M.C., Leader, Mr. R. W. Shooter. Mr. Tawn has done splendid work in connection with various sections of the Club, specialising in Lectures and experimental work in scientific subjects. He is now in the Forces, but joins in Club activities whenever he has the opportunity.

championships. Model-building activities have been intensified, and a selection of the models built have been photographed. Members are making preparations for taking part in a Youth Week organised by the Exeter Youth Parliament. Club roll: 260. *Secretary: I. L. Coates, 103, Monks Road, Exeter.*

HORNSEA M.C.—The usual varied programme has been followed by the Sections. The Senior members are continuing work on telegraphy and radio set construction. Meccano models also have been made, and Lectures have been given on various topics. Among the Lectures were two by Mr. Tawn, deputy Leader, on "The History of Medicine" and "Animals." Games also have been played and Cinema Shows have been given. Club roll: 36. *Secretary: C. Kemp, 5, Carlton Terrace, Hornsea.*

PLYMOUTH M.C.—Activities continued on the same lines as in previous months, special attention being given to the re-wiring of the Club's Hornby-Dublo railway. Entertainments have included a Cinema Show given by the Youth Hostels Association and a "Parents' Afternoon," which included a Concert by the Club's Dramatic circle. Club roll: 97. *Secretary: S. R. Finnemore, 5, Mutley Plain, Plymouth.*

BRANCH NEWS

GUISELEY—The Branch is making excellent progress under the leadership of Miss Barrett, Chairman. Various layouts have been tried, and timetables carefully worked out to give interesting running. The latest track represents the L.M.S. line from Bradford to Hellifield and Morecambe on the one hand, and to Leeds and London in the opposite direction. There are excellent sidings, on which shunting practice is carried out, and a complete signalling system is being installed. Occasional meetings are devoted to discussion of the layout and operations. *Secretary: L. Binns, 12, Wells Road, Guiseley, Leeds.*

LONG ITCHINGTON—Special attention has been given recently to signalling, and two types of signals, one of the colour light variety, have been introduced. The Branch "Office" works splendidly and the Library is in good order. Officials recently had a good time at Rugby, and a Branch visit to that junction is being arranged. *Secretary: H. Windsor, The Shop, Long Itchington, Nr. Rugby.*

SOUTH AFRICA

SAXONWOLD—Steady work is being carried out. The Branch rolling stock includes a locomotive and eight wagons. A good track has been laid down and accessories are being collected and installed in readiness for actual running. *Secretary: R. Harvey, 26, Northwold Drive, Saxonwold, Johannesburg, South Africa.*

CLUB NOTES

EXETER M.C.—Football activities have reached a climax, with all Clubs well in the running for their League

championships. Model-building activities have been intensified, and a selection of the models built have been photographed. Members are making preparations for taking part in a Youth Week organised by the Exeter Youth Parliament. Club roll: 260. *Secretary: I. L. Coates, 103, Monks Road, Exeter.*

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Hints for Hornby-Dublo Owners

IN normal times, when Hornby-Dublo trains are for the most part obtained new, the leaflet packed with each train set and locomotive provides all the instructions necessary for successful running. In these days of second-hand material, however, these leaflets often cannot be found and passed on to the next owner so that much valuable advice is lost. A few hints will therefore be helpful to purchasers of second-hand Dublo sets.

If the rails have been stored away for any length of time they are likely to be more or less coated with a mixture of oil and dust. It is probable that the engine wheels and collector shoes, also the rolling stock wheels, will be in a similar condition. For rails, more or less vigorous wiping with a clean dry cloth will usually correct matters; but if conditions are very bad it may be necessary to moisten the cloth with petrol. Wiping the wheel treads may be sufficient, but any hard "caked" deposit may require the use of a match stick or something similar, held against the wheel tread to "peel off" the deposit while the wheels are revolved by hand. Never be tempted to use emery cloth or sandpaper.

When laying the track see that the rail ends fit neatly together in the little "fishplates" that are provided alternately at each end of each rail section. The centre connecting clips must be clean and must make good contact. They must not touch the track base or a short circuit will be caused as soon as the current is on.

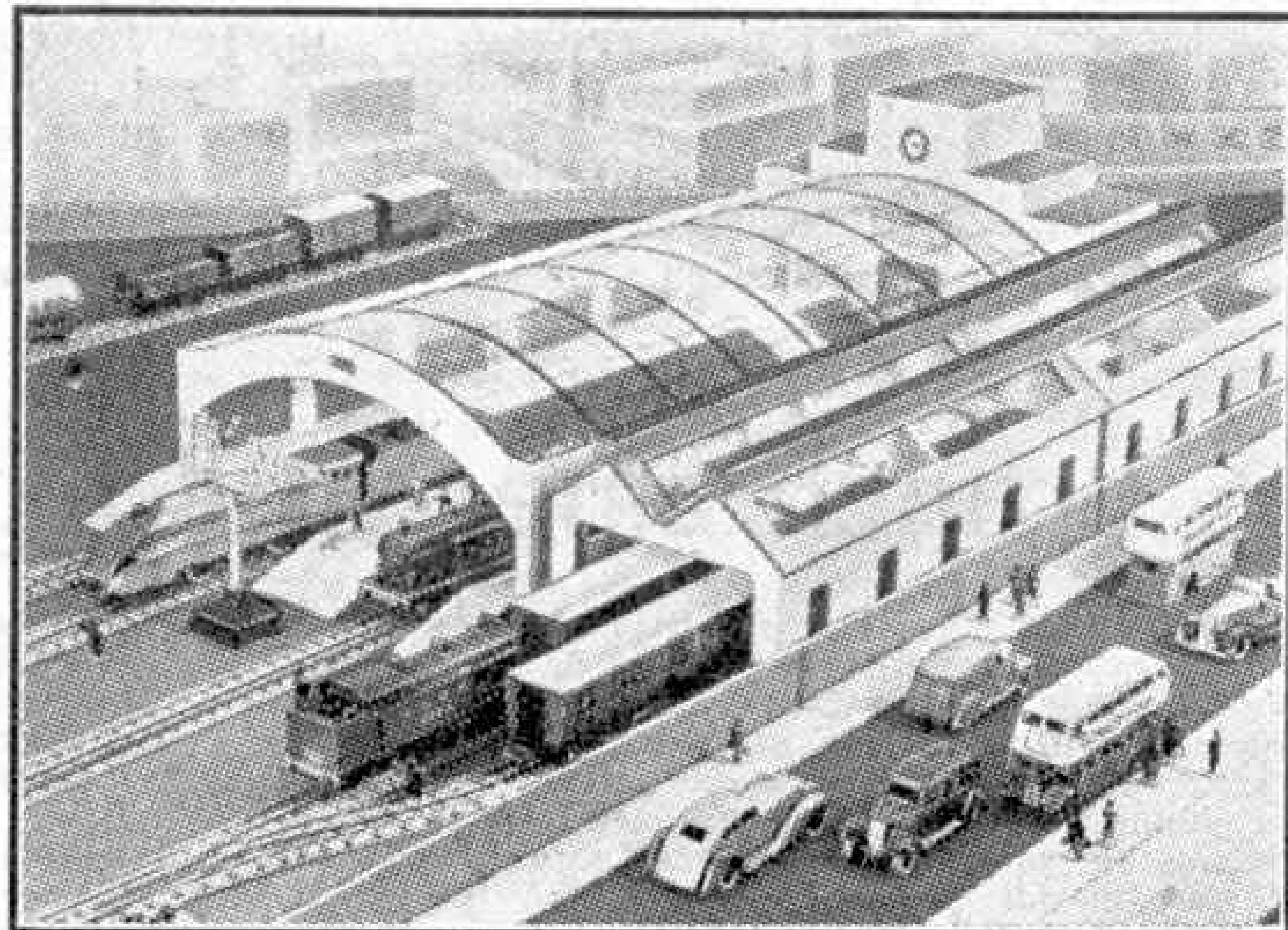
Connections from a Dublo No. 2 Transformer to two Controllers, each wired to a separate track, are shown in the lower illustration. Exactly the same

principles apply when a No. 1 Transformer and a single Controller are wired to a single track. It is often necessary to point out that although the Dublo Transformer No. 2 has two outputs each of 10VA at 12 volts, and is intended for use with two locomotives, these two locomotives must each be on a separate track. Each track has its own controller wired up as shown in the illustration. The two locomotives cannot be used on the same track.

By "separate" track we mean electrically separate. This does not mean that the two tracks have to be completely cut off from one another without any running connections between them. Points can be laid down between the two tracks so that a train can be run from one to the other almost as freely as on a clockwork system. Let us see how things are arranged to make this possible.

Each of the two tracks has to be an electrically separate unit; therefore we have to provide an insulating gap at a convenient point in any of the rail connections, such as crossovers and so on, between the tracks. It is not sufficient, as is often thought, to have an insulating gap in the

centre rail alone at any of these points. This is because with Hornby-Dublo electric locomotives, which have what are known as permanent magnet motors, reversing is effected by changing the direction of the current passing to the motor by way of the rails; in other words, by changing the polarity of the rails.

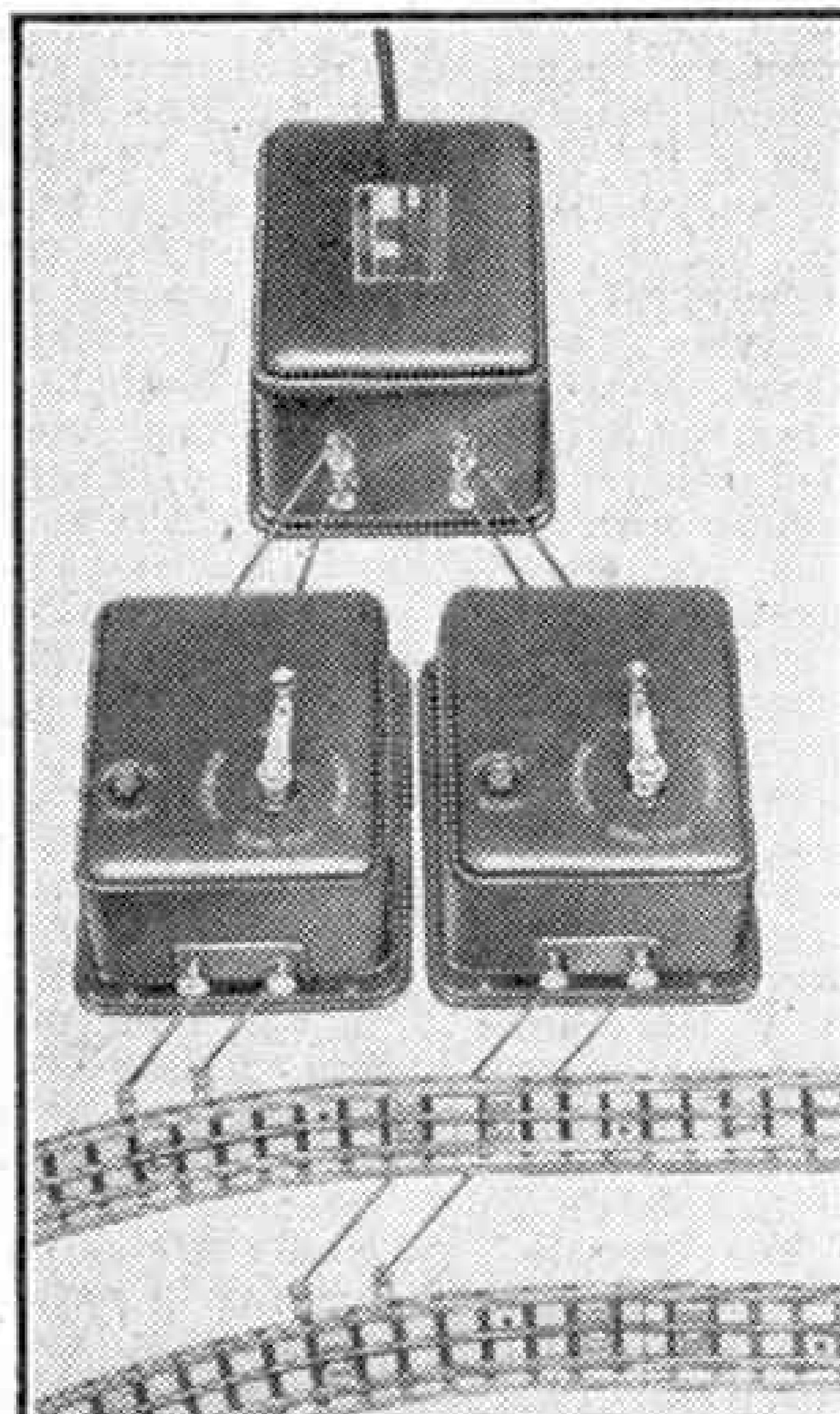


A terminus on a Hornby Dublo electric layout.

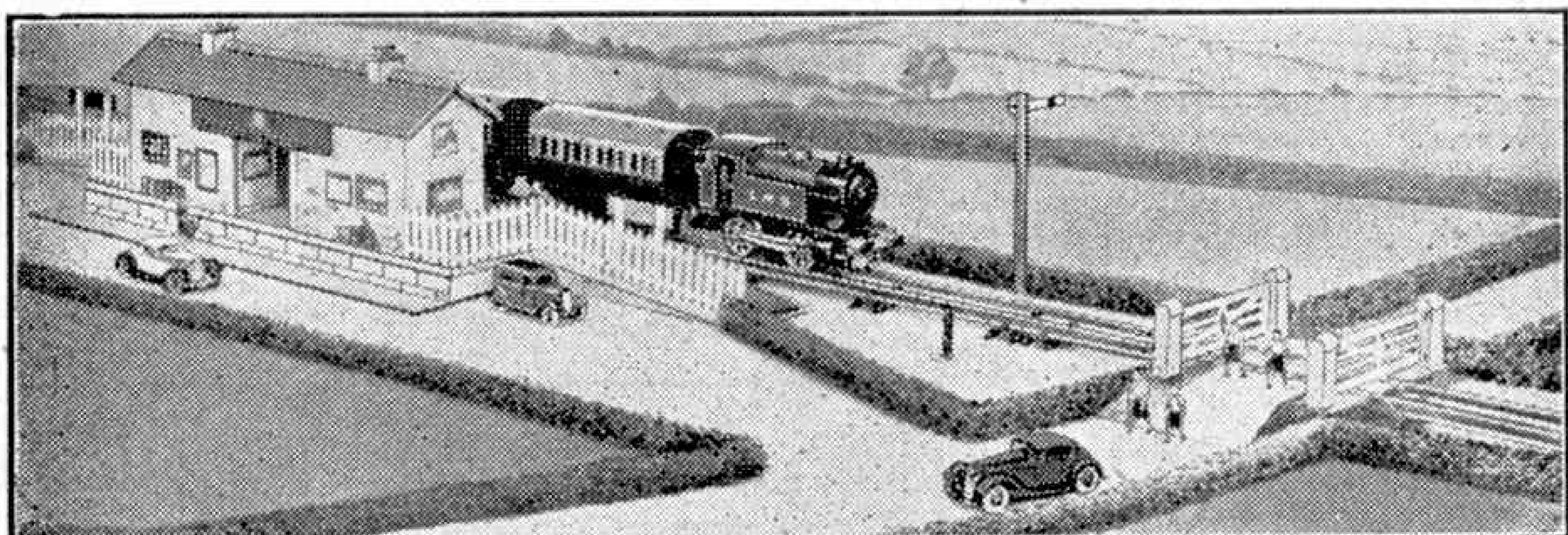
Therefore it is necessary to insulate each track completely from the other by providing a break of contact not only in the centre rail, but also in the running rails. For similar reasons, when an engine is to travel from one track to the other by means of any of the running connections, the Controllers must be adjusted so that the rails in each circuit are of corresponding polarity. Otherwise there would be a short circuit as soon as the collector shoes and wheels bridged the gap between the two separate systems.

A gap between the adjacent lengths of centre rail is easily arranged. The centre rail connecting clips can be removed, or a piece of paper placed between them will effectively insulate one from the other. On a permanent system removal of the "fishplates" and the screwing down of the rail sections to the baseboard to preserve alignment, with just the smallest gap between the ends of the rails themselves, is all that is necessary to deal with the running rails.

For temporary tracks centre rail procedure is the same, but the running rail alignment raises a little problem. One way of dealing with this is to mount the two-rail sections concerned semi-permanently on a piece of very thin wood. Another scheme is to cut a strip of cardboard that will fit tightly inside the hollow track base of each of the two rails adjacent to the gap, and in this manner keep the rails in line while still maintaining the necessary fraction of space between them.



The correct method of connecting a Dublo Transformer No. 2 and Controllers to a double track system.



Branch line operation on a Hornby Railway; note the "people" walking on the Level Crossing.

Branch Lines and Light Railways

IN these days of "making do" with whatever Hornby Railway equipment we may be lucky enough to possess there is a great deal to be said for the reproduction in miniature of lines of the branch or "light railway" kind. Layout and equipment can be simple and as many such lines have a definite "character" of their own we can introduce various schemes of our own quite reasonably. Branch line operation is sufficiently attractive on its own account, so that even in normal times many layouts included a branch line where simpler equipment and operating schemes were in vogue than on the more important main line section of the railway.

If we have just one engine, a coach or two and a few goods wagons, and of course a certain amount of track to run them on, we can have quite a lot of fun. The track layout need not be elaborate for single line working, and the minimum of sidings, signals and so on are the rule on most branches. This applies too in general to light railways, except that the latter are often less elaborate than branches thrown off from a junction point on one of the chief main lines. For the present, however, we will consider them as one and the same thing.

Generally it is difficult, indoors at any rate, to obtain sufficient space to make the line a non-continuous one. Where it can be done, however, more realistic working is possible than with a continuous track. The main line station where the branch line starts and the local terminus where it finishes can be included with more or less detail according to whether the railway is laid down permanently or is of the temporary kind. Yet a continuous track with one station can be quite entertaining. Perhaps we can base it on a branch line that we know. If not, then here is our chance to develop our working schemes to suit the stock and so on that we have.

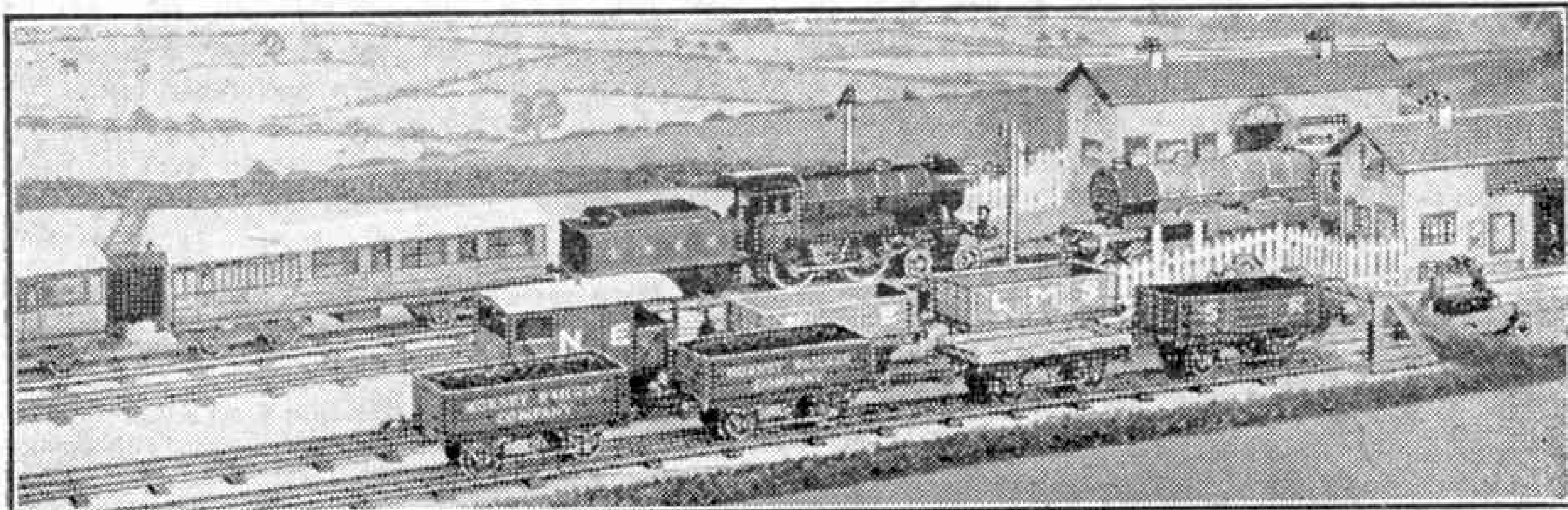
A "truly rural" line will in addition to passengers carry a certain amount of agricultural traffic; this will mean a Milk Van or possibly even a Milk Tank, and we shall require Open or sheeted Wagons or Vans for various kinds of produce. There may occasionally be a little lumber traffic or livestock to deal with, and there will be domestic coal and so on to meet the requirements of our branch line "people." These of course are just a few brief ideas; readers interested can develop them to almost any extent to suit their own particular circumstances.

A single track line worked by "one engine in steam" suits miniature railway requirements very nicely. Only a few signals will be necessary, chiefly at stations and perhaps at a level crossing where the railway cuts across a "main road." Everything

can be worked out on these lines by the individual Hornby Railway "Manager." While it is preferable to use a standard Station, especially for the "Junction," it is not necessary to do so for an intermediate "halt" or branch terminus. An effective halt can be made by a length of standard Passenger Platform, "passengers" approaching from the road by means of one of the end ramps at the bottom of which a Platelayers' Hut or similar little building can serve as the "booking office."

The branch line train has been something of an institution on British railways for many years. Usually it is headed by a small tank locomotive and often comprises a few coaches of the older types. Certain branches on the other hand may boast quite an up-to-date locomotive and more modern stock, especially if there is a certain amount of regular residential traffic. Therefore we can use practically any of the Hornby 4-wheeled types of Tank Locomotive quite successfully and the train may consist of No. 1 or No. 2 Coaches. If the latter are in use a pair of composite vehicles makes a handy branch line unit, a brake and luggage compartment being provided at each end in the regulation manner. With No. 1 vehicles a pair of Coaches and a Guards' Van may be considered to form a satisfactory branch train. Normally the engine and coaches will all be in the one company's finish, but under present-day conditions this need not be so, as engines and stock are frequently transferred between the different systems.

Similar variety is possible too if we are working a "light railway" that is operated independently rather than one on which motive power and stock is supplied and operated by one of the big systems. An independent line may have vehicles and engines from several different sources, usually second hand and sometimes still in their original finish. Therefore, we can assemble quite a mixed train and still be correct, providing that we have the right "character" about our system. Even tender locomotives can be used, though these may have to make the journey "tender first" in one direction owing to the lack of a turntable. This is not unknown on branch lines of the larger systems, and the engines so used sometimes have a "weather board" or a rudimentary shelter on the tender for better protection of the engineman when running in reverse. We can fix up a weather board quite easily for a tender if we prefer this type of working because of its novelty. A piece of cardboard will do, cut to fit tightly between the tender sides at the front end and provided with two holes, similar to cab windows, for lookout purposes. Painted black, or perhaps to match the engine colour such a gadget is quite effective.



Up and down trains passing on a Hornby Railway representing the L.N.E.R.

A Canadian Reader's Hornby Layout

Miniature L.N.E.R. Working in Vancouver

THE Hornby layout shown in the diagram on this page is of special interest, apart from its operating features, in representing the working of the L.N.E.R. so far away from the real system as Vancouver, British Columbia. In its present form it is the work of Mr. G. Eagle, and in its operation he is ably assisted by the other joint owner, his grandson, Robert Goddard.

One reason for the selection of the L.N.E.R. as the prototype system is that Mr. Eagle was in the service of the former G.N.R. until 1916 and his father before him was an engine driver of the same company, stationed at Leeds. Operations are based mainly on the King's Cross and Leeds services, with subsidiary West Riding running.

For the present the railway is of the portable variety, but the rails are screwed down on a base-board arranged in sections to make assembly and packing up operations easy and the track has all the advantages of a permanent line in the way of a smooth base and good alignment. The layout is electrically operated and Hornby Tinplate Rails are used.

The main line consists of the usual oval with separate up and down tracks; and from each of these branch lines are thrown off to serve various sidings. Shortage of the necessary materials due to wartime conditions has caused certain modifications; so that while lengths of Hornby Double Track Rails are in use a great deal

of the line consists of the normal single-track components. In the adjustments necessary to secure as symmetrical a line as possible good use has been made of the handy Half and Quarter Rails familiar to all Hornby owners.

Close to the Station, which appears on the upper side of the main line in the diagram, the up and down tracks are connected in the regulation manner by trailing Crossover Points. The branch track from the outer main track leads to the carriage sidings behind the Station, each siding being capable of holding a full rake of four bogie coaches. The other branch, from the inner main track, leads to the locomotive department, where a Turntable and Engine Shed are provided. Before the Turntable is reached, however, connection is made with the goods sidings, where a Hornby Goods Platform provides loading and unloading facilities.

The various buildings on the line are all of the electrically illuminated kind, as are the Signals, current being obtained for them from the Transformer, which is of the T20A type. To prevent any mishap, as there is only one Transformer the two Shed tracks are each insulated from the rest of the railway and can be switched "in" or "out" as required. Thus one engine can be held at the Shed without interfering with the operation of the other.

Two complete passenger trains are in use, four bogie vehicles being the normal make-up. One of these consists of No. 2 Corridor Coaches with a Brake Composite at each end, this making a typical L.N.E.R. train. The other is composed of No. 2 Saloon Coaches. There is also a non-corridor No. 2 Brake Third, which is useful for "through coach" and connecting workings. Goods stock includes several bogie High Capacity Wagons for brick traffic of the kind so familiar in the L.N.E.R. Southern area. There are also bogie Trolley and Timber Wagons and four-wheeled Vans for cattle, milk, fruit and meat traffic; also the usual open Wagons. The locomotives are respectively the Hornby E320 "Flying Scotsman" and the fine looking Hunt class E220 model "The Bramham Moor." They have to work hard, for the line is operated on what we might call a "mileage" system. One circuit of the main line is supposed to represent a mile and the correct mileage is run between "King's Cross" and the various intermediate stations on the run to "Leeds" and back. Similar arrangements govern "Newcastle" traffic, and branch services to "Nottingham" and "Leicester" also are included.

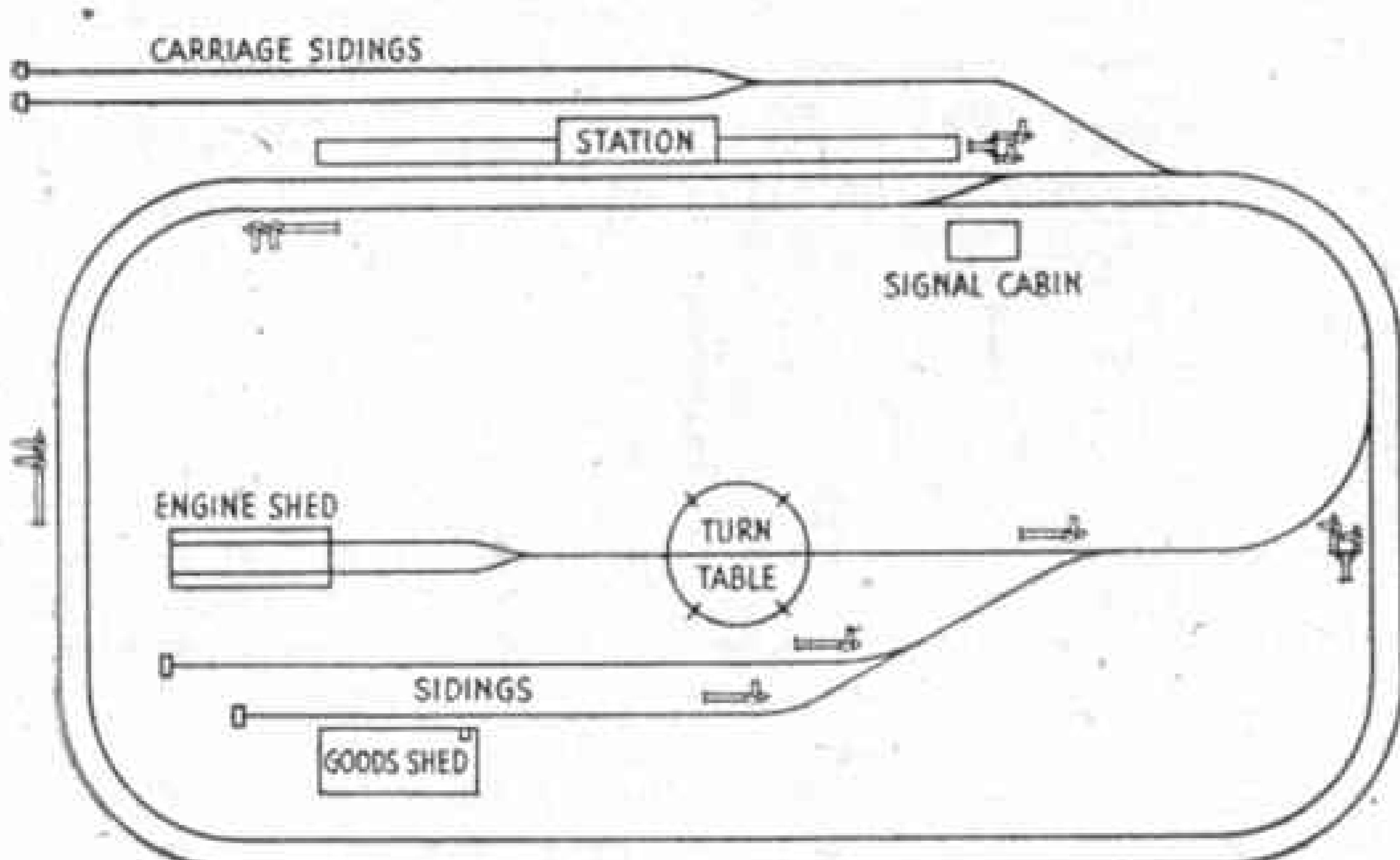


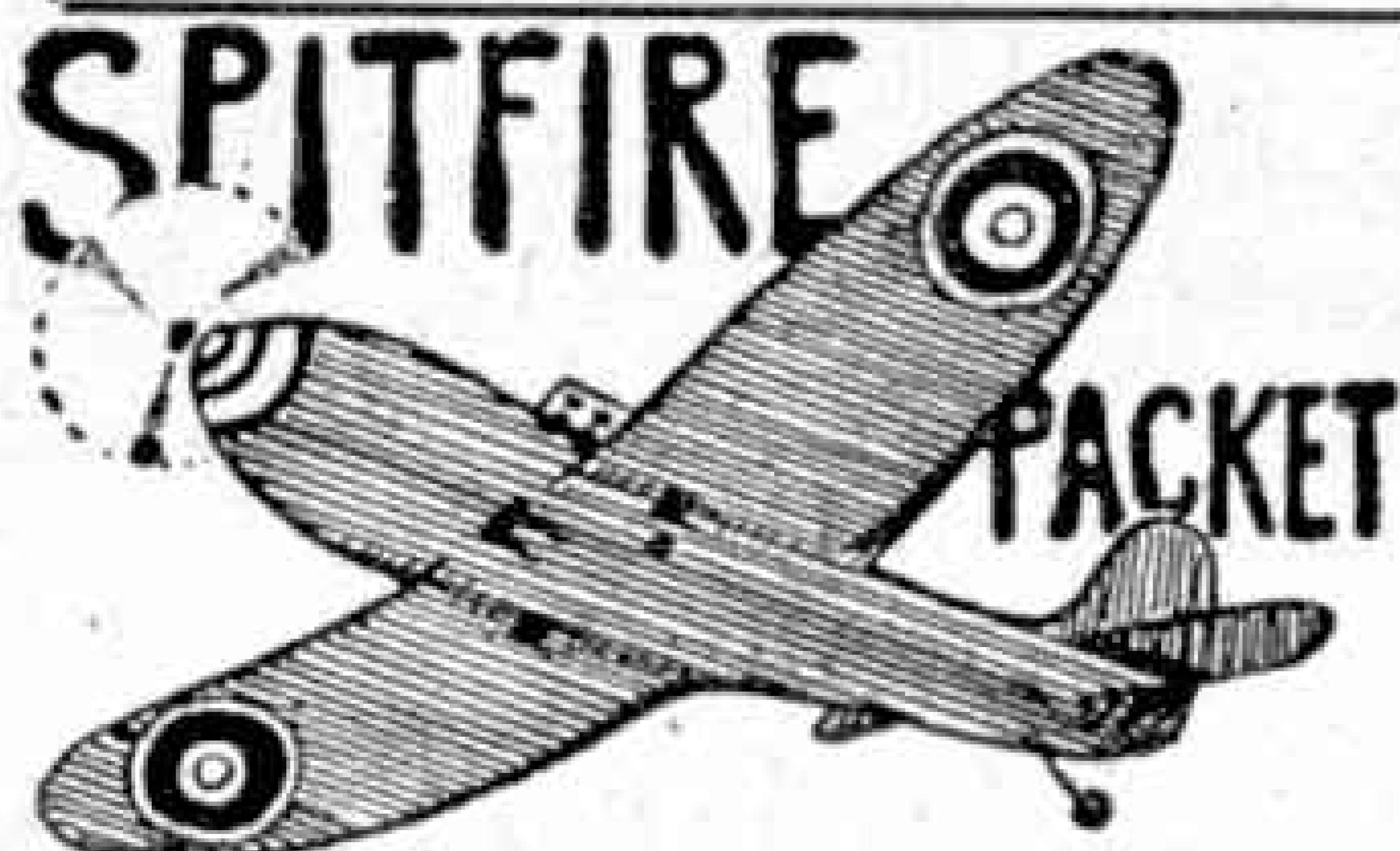
Diagram of the layout of Mr. G. Eagle, Vancouver, that is described on this page.

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Stamp Collecting

Looking at the Stamps Themselves

By F. Riley, B.Sc.

NOW that we have seen how to get stamps, and how they are best arranged, it is time to look at the stamps themselves, and here comes the real interest of stamp collecting. Carefully arranging stamps in an album so as to make an impressive picture is not enough; the stamps themselves are worthy of the closest attention. To quote the collector's slogan, "*The stamp's the thing.*"

The first feature of a stamp of which to take notice is the design. The original idea of the stamp was that it was a kind of label to indicate that postage had been paid, and we find the first adhesive stamps, the famous Penny Blacks, of comparatively simple design. They show the head of the reigning Queen, with an ornamental framework and the word "*Postage*" at the top, while the value was shown at the bottom. An interesting point about this design was that the name of the country of issue did not appear, and this practice has been followed ever since by Great Britain.

When the use of stamps spread to other countries their names were introduced, and these are therefore prominent features of practically all stamps apart from those issued in this country. To begin with, the general rule was to follow the plan adopted in Great Britain of making the head of the ruler of the state the principal feature, although there were exceptions. A notable one was provided by Brazil, the second country in the World to issue adhesive stamps, for its first productions simply show the figure of value on an elaborate design that looks something like a football. These are the now famous and valuable "Bull's Eyes." Then it was realised that stamps lend themselves to pictorial effects of all kinds, and to-day there are thousands of stamps that are pictorial in character, showing famous buildings, beauty spots, scenes of native life, agricultural products such as fruit, cereals, and so on, providing endless variety and adding to the pleasures of collecting. The general idea has been to draw attention to outstanding features of the country of issue.

A special purpose to which stamps have been put is that of commemorating a famous event, or the birth or death of some great man. Stamps of this kind form the well-known commemoratives, which now have come in numbers from practically every country but Great Britain, the original home of the

stamp. This country did issue commemorative stamps for the British Empire Exhibition at Wembley in 1924-25, and on a few later occasions, but these were poor efforts. The policy of issuing commemoratives

here may be adopted in future and it is to be hoped that we shall then get efforts more worthy of comparison with the best stamps of this kind from other countries.

Commemoratives are distinguished from ordinary stamps bearing portraits of great men, or showing historical scenes, in that they were on sale for limited periods, and did not form part of the regular continuous issues.

They carry dates, and their inscriptions speak of centenaries, and so on, and the writing up of such stamps in the album should note the principal facts connected with them.

The next development was the appearance of charity stamps. Some commemoratives, and indeed certain ordinary stamps without any special excuse for their production, have in the past been issued at least partly with the idea of raising revenue for the country producing them, chiefly of course from collectors. This practice has not been very prevalent, for collectors soon showed what they thought of it. Now charity stamps are issued for the purpose of raising money, but this is a different story, for the funds so produced are applied to excellent purposes with which we all sympathise. A very fine example is the series of New Zealand Child Welfare stamps, the 1943 issue of which was illustrated in the January "M.M." This is typical of the charity issues in that there are two values on the face of the stamp, one its postal value, and the other the overcharge that is devoted to the charitable purpose indicated. Red Cross stamps are other excellent examples of this kind.

When the collector obtains a stamp he can usually determine the country of issue from the name included in the design, but he wants to know much more than this about it. He wants to know when it appeared, whether it was definitely commemorative or a normal issue, and certain other things that we shall see as we proceed. For these details,

which are really necessary in arranging the stamps in the album as well as in writing up, the guide that he requires is a catalogue, which is as valuable to him as the mariner's compass is to a seaman. One such catalogue, a standard in Great Britain, is that of Stanley Gibbons Ltd., which is issued in two sections dealing respectively with the British Empire and with other countries. For the younger collector the "Simplified" Catalogue of the same firm would be sufficient. Like the large one it lists all stamps, with illustrations of their designs, but it does not give as much detail in regard to varieties. Another catalogue that the young collector will find useful is that issued by Whitfield King and Co. and known as the "Standard."

Unfortunately catalogues are a difficulty at the present time. Paper restrictions have made it necessary to reduce the number printed, and to publish at longer intervals instead of annually, as in peacetime. The prices too have been (Continued on page 141)



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6d. ea. 72, 75, 79, 80, 86, 126, 154, 159, 161, 162, 177,
178, 181, 203, 215 Mint, 218 Mint, 232, A2,
9d. ea. 76, 122, 132, 136, 215, 218, 233, E2,
1/- ea. 67, 68, 133, 135, 185, 223, 226. 2/6 ea. 204,
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Stamp Gossip

and Notes on New Issues

More Free French Air Stamps

In the December 1942 "M.M." an air mail stamp was illustrated that had then been issued in several Free French countries. The design showed a modern four-engined aeroplane, with the Cross of Lorraine on a white shield to its left. Air mail stamps of the same design have now been issued in the remaining Free French countries Madagascar, Reunion and Djibouti.

In each case there are seven values, as before, and these have the same colours as the corresponding values of the earlier issues. They are 1 fr., red-orange; 1 fr. 50, scarlet; 5 fr., red-brown; 10 fr., black; 25 fr., ultramarine; 50 fr., green; and 100 fr., claret.

A Fine Portrait Series

The new Jugoslavian set is now available for collectors, and it is of great interest. Unlike the sets issued in this country by other exiled Governments, it is not pictorial in character, but carries a series of portraits of famous Jugoslavians, the idea being to portray the builders of modern Jugoslavia. Each is in two colours.

Three of the six stamps in the set feature Serbs, and on these the names of the men portrayed are given in Eastern script. The remainder depict Croats and Slovenes, and on these the names are in Latin or Western script.

The values, colours and portraits of the six stamps are as follows: 1 dinar, black and scarlet, Vodnik, a Slovene poet and writer; 2d., black and green, the Prince Bishop Njegos, of Montenegro, who was an apostle of Slav unity in the Balkans; 3d., black and blue, Gaj, a South Slav writer of importance who unified the literary language of his country; 4d., sepia and violet, Karadjic, Jugoslavian lexicographer; 5d., sepia and purple, Strosmajer, a Croatian bishop who advocated Jugoslav unity in the middle of last century, when his country was part of the Austro-Hungarian Empire; and 10d., sepia and brown, Karageorge, who led the first Serb uprising in 1804, when the country was under Turkish rule. The 1d., 3d. and 10d. stamps are illustrated on this page.

New Issues and Printings

One of the stamps we illustrate this month is an unusual commemorative from the Argentine Republic. This carries the dates 1809-1943, and presumably marks the day, 19th July, 1809, when the Viceroy of the Argentine, then under Spanish rule, opened the trade of



the country to foreign nations. Besides the dates it carries the words "Dia de la Exportacion," which mean "The Day of Export." It is in black and white, and is interesting because of the curiously crowded scene for a stamp picture, showing the port of Buenos Aires in 1809, with sailing boats on the river and clumsy horse-drawn carts on the shores. Its value is 5c.

Another new stamp is the 2c. Ceylon shown at the head of this page. The design is a familiar one, as it has already been used for stamps

of both King George V and King George VI, but it now appears in a new shade, from a new printer, de la Rue. The former issue was from Waterlows. New shades, different paper, different perforations and in certain cases new colours mark the issues of British Colonial stamps these days, and the new printings that are appearing from time to time are all of the very greatest interest. Examples have already been given in these columns and there are more on the way. For instance, a new 4d. stamp is to be brought out for Nigeria. This will be blue in colour, and colour changes are foreshadowed for the 1d., 2d. and 3d. values. Aden also is bringing out a new 14a.

stamp, which no doubt will be used for air mail postage. A new 1/3 stamp in yellow for a similar purpose has appeared in Sierra Leone, its design showing rice harvesting, being the same as that of the existing 1½d. value, illustrated in last month's "M.M."

Readers should note that it would be a good thing to fill up any gaps in their sets of Aden States stamps, for new printings may be of different perforations.



Looking at the Stamps—(Continued from page 139)

increased, but whenever possible a collector should obtain a copy of one of these catalogues to use as a guide. It is not essential to have the latest issue, and it is certainly far better to have one of a year or two back than to have none at all. An old catalogue does not give details of stamps issued in the last few years, and the stamp prices in it may be out of date, but it will still serve as a guide to the collector in identifying and arranging his stamps.

Now let us see what the collector learns from the catalogue when he examines his stamps with its aid. The first step is to identify the design, and here the illustrations are helpful. Besides giving the date of each issue, the catalogue tells the collector if it was commemorative, or a charitable one. It also gives the colours, and these should be noted carefully, for colours often serve to identify different stamps of the same design. Two other items that the catalogue gives are the watermark and the perforations. The collector should know something about both of these, and next month we shall deal with these important topics, and with other outstanding features of stamps.

Remarkable Runs of Years Ago—

(Continued from page 117)

service via Oxford to take over the return express at Leamington. It was "*Launceston Castle*" that evening, in charge of a driver well known at the time who has since retired. This is engine No. 5000, which distinguished itself during test runs on the L.M.S. line in 1926. I had a chat with the driver, while they were waiting on the centre line, reminding him of a fine "*Cheltenham Flyer*" trip he had given me not long before, and said I hoped for a good run that fine autumn evening.

It was a very light six-coach train from Leamington, weighing 220 tons gross, so the "*Castle*" soon got going up Southern bank. After a maximum of 78, she eased slightly through Banbury, passed in 20½ min. for 19½ miles, already 1½ min. early. Very soon even time had been surpassed and we ran on to the direct London line at Aynho Box. Then, while dinner was being served, came a terrific burst of speed! With the impetus of a 1 in 200 descent from Ardley and the engine evidently opened out, we were up to 88 m.p.h. at Bicester, rising to 92 on the short level and falling lengths between Blackthorn and Brill, averaging 87.8 for six miles, including a 1 in 200 rise, and continuing very fast until past Princes Risborough. The dining car was a long-wheel based eight wheeler, perhaps nearly due for a visit to shops, and when speed soared into the nineties there was very decided oscillation in it for a minute or two. Crockery jumped about, beverages spilled, and a few of the passengers appeared slightly alarmed. I felt a little guilty if the driver was indulging in a display for my benefit, but I was timing with thrilled exhilaration. One of the attendants, having restored order on the tables and resumed serving a course, came up and whispered to me, with a twinkle in his eye, "We are still on the rails aren't we, Sir?" Of course we were and perfectly safe!

As soon as that rough patch of track had been passed, riding was as steady and comfortable as usual, although the timing was being cut by handfuls! We stopped at High Wycombe to set down passengers nearly 7 min. early, having covered 60½ miles over varying gradients in 56½ min. at an average of 64.8 m.p.h. start to stop. Despite successive signal checks on the descent past Gerrards Cross to Denham, Paddington was reached 4 min. before time, so that on this exciting journey, although stopping for 3 min. at Wycombe and then suffering 4 min. loss by signal delays, the total time for 87 miles from Leamington was only 91½ min., nearly a minute less than the allowance then given to the quickest (heavier) non-stop express over that course. A "red letter day" indeed.

Two Fast Motor Ships—(Continued from page 125)

cooled. Each main engine has its own cooling water and lubricating oil system. The engines drive their own blowers.

The exhaust gases from the engines are used to heat a boiler and thus provide hot water for the accommodation when the ships are at sea.

The main engines were designed to give each ship a speed of 21.5 knots, but during the trials of the "*Transilvania*," at which the author was present, a mean speed of 24.5 knots was obtained, the engines developing a maximum output of 19,450 indicated horse power at 135 r.p.m. The maximum speed of the sister ship, over the measured mile, was 25.7 knots, and the mean figure of four consecutive runs was 25.3 knots, the main engines in this case developing the amazing output of 21,885 indicated horse power at 141 r.p.m.! This speed was a world's record for Diesel-driven ships of this size.

Reference to the photograph of the "*Transilvania*," on page 125, gives some indication of the attractive lines of the ship, the ideal weather conditions under which the trial trips were carried out, the clean stem cleaving the smooth water at 24.5 knots, and the

foamy stern wave following the vessel as she rushes along. The picture was taken from a fishing boat off the coast of the Danish island of Bornholm in the Baltic. The reader should note very carefully that the exhaust gases are leaving the funnel as a colourless haze, indicating the excellent combustion of the Diesel engines, both main and auxiliary. What a pleasant change from the black smoky trail of the coal burning steamer, and what a happy promise for future ocean travel in comfort and safety.

The Horse on the Farm—(Continued from page 115)

before setting him to work. Then he is "broken in" by either a professional horse-breaker or, quite frequently, by the farmer himself. It is important that the greatest care should be taken with him during the first year of his working life; he must be handled tenderly but at the same time firmly, until he gradually learns what is expected of him and becomes docile and obedient.

In most counties interest in the farm horse and the teamsman who works him is encouraged by means of ploughing matches during the autumn and winter months. A match is an occasion for a day out for the farmer and male members of his family. The keenness of the competitors is very plain to see, and, as an additional incentive, awards are made for the best and cleanest teams as well as for the actual ploughing. The physical effort that is expended in making horses and gears spick and span is very considerable, especially the night before the match, when this big job goes on well into the early hours.

Have You Ever Thought About This?—

(Continued from page 128)

as the outer rail is gradually raised the curve becomes sharper, until finally the full height is reached, and from the transition the train passes smoothly on to the curve proper.

It is of course very important that these transition curves, and indeed the main curves too, be kept in correct alignment. When they are originally set out, by an expert surveyor, pegs are driven in at intervals to mark the centre line of the track. With the constant passage of traffic the rails may shift slightly from their true position, and then the pegs are there as a valuable aid to the permanent way inspector in maintaining the track accurately, and so ensuring the smooth running of trains at the highest permissible speed.

COMPETITION RESULTS**HOME**

November "Word" Contest.—1. T. J. Murphy, Newcastle; 2. P. Gaskin, Liverpool 13; 3. B. Helberg, London N.W.1; Consolation Prize: H. Middleton, Hodthorpe.

December "Photographic" Contest.—1st Prizes, Section A: J. H. Gittens, Weybridge; Section B: G. Fowler, Dursley. 2nd Prizes, Section A: R. Barrett-Lennard, Cressing Vicarage, Nr. Braintree; Section B: B. Priestley, Silcoates School, Nr. Wakefield. Consolation Prizes: J. F. K. Hinde, Harrow-on-the-Hill; C. A. Reader, Guildford; L. Williams, Liverpool 17.

RESULTS OF JANUARY MISSING WORD COMPETITION

For the best and most apt set of answers the judges have awarded the 1st prize of £5 to:—
MASTER M. J. PRATT of HARBORNE, BIRMINGHAM. The second and third prizes were divided equally between 28 entrants each of whom has received 3s. 6d. with the exception of Master M. SELNER of SWINGFIELD HOUSE, who failed to give his address. His prize is waiting to be claimed.

Competitions! Open To All Readers

A New Doublets Contest

It is a long time since a Doublets puzzle was announced in these pages, and we are therefore setting one for this month. The idea of the contest is simple. A Doublet consists of two words, and one word has to be changed to the other through a series of linking words in which only one letter differs from those of the previous link. It will be seen that the two words necessary must contain the same number of letters, and the game is to make the complete change with the smallest number of links.

The Doublets for the present contest are given in the panel on this page, and here is an example to make everything clear; DRAG name in DUST. The solution here is DRAG-drat-doat-moat-most-must-DUST. It will be seen that the passage from each link to the next is made by changing only one letter.

In making links only English words

Can a BOAT become a SHIP?	
Use	SOAP for a WASH.
	CALL soldiers by RANK.
Any	PORT in a GALE.
	BEAT the DRUM.
Put	CASH in BANK.
Don't	SEEK a LOAN.
Use	FILE to make MARK.
	FURL the SAIL.
	REAP Britain's CORN.

appearing in a standard dictionary may be used, and the names of persons, places, are not allowed. The first solution arrived at may not be the shortest so competitors should go over their solutions carefully in search of short cuts. In judging one mark will be given for each link, and the prizes will be awarded to the senders of the lists in which the total number of links is lowest. In the event of a tie, preference will be given to the entry or entries with the neatest or

most novel arrangement.

The Contest is divided into two sections, for Home and Overseas readers respectively, and in each prizes to the value of 21/-, 10/6 and 5/- will be awarded for the best solutions. Entries must be addressed: "April Doublets Competition, Meccano Magazine, Binns Road, Liverpool 13." The closing dates are: Home Section, 31st May; Overseas Section, 30th November.

Locomotive Parts in Disguise

The strange-looking words below have been formed by mixing up the letters of the names of parts of locomotives. Readers of the "M.M." generally, and railway enthusiasts in particular, are familiar with the many features of a locomotive, including the boiler and fire-box, with all their fittings, the cylinders, the motion and the wheels. The names included in this contest should therefore be well-known to all of them, and they should have little difficulty in finding what they are:

The jumbled words are as follows:

OBXIERF;	NDSA XBOSE;
LIERBO;	MKEOSXOB;
JTCENIRSO;	GNSVIERRE RDO;
NCEAABL THGSIEW;	DILES RSBA;
LPCOUDE LHSEWE;	CRITENCCE ORD;
LUGERTOAR;	KMSOE FLDECTR SOE;
PERHESUREAT;	SIUADR DRO;
TSLBA EPPI;	SSROCHADE.

In order to make everything quite clear we may point out that a glance at the first example, OBXIERF, suggests a box of some kind, judging from the first three letters. There certainly is a box in a locomotive. This is the fire-box and it will be found that the remaining four letters make up the word fire. Thus fire-box is the solution to the first of our jumbles. In some cases there are two words, but this is clear

from the jumbles concerned.

There will be the usual two sections, for Home and Overseas readers respectively. In each section prizes of 21/-, 10/6 and 5/- respectively will be awarded to the readers who submit the three best lists of the locomotive parts disguised by the 16 jumbles. In the event of a tie neatness or novelty will be taken into consideration. Entries must be addressed: "Locomotive Jumble Contest, Meccano Magazine, Binns Road, Liverpool 13." Closing dates: Home Section, 31st May; Overseas Section, 30th November.

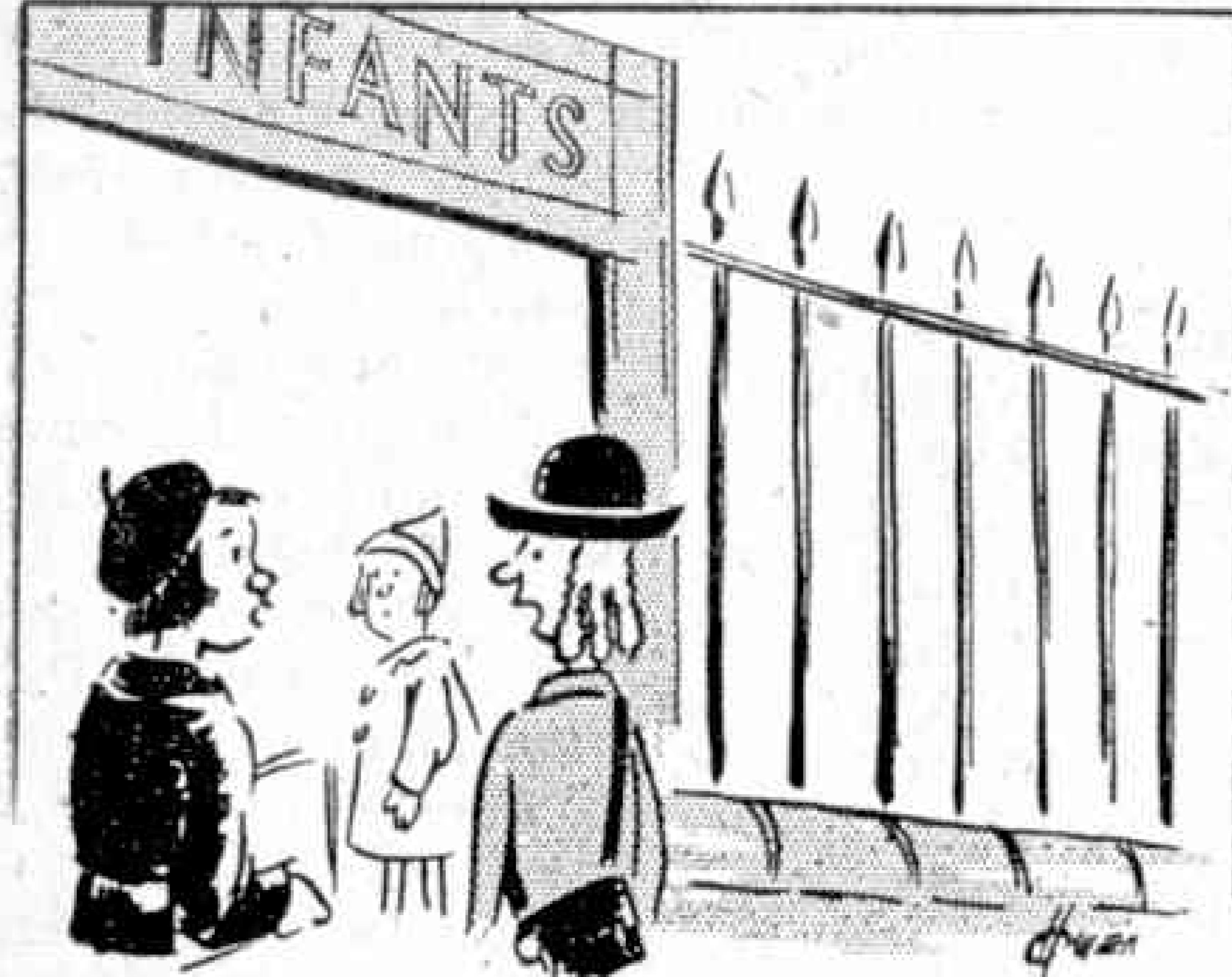
April Photographic Contest

This month's contest is the 4th of our 1944 series, and in it, as usual, prizes are offered for the best photographs of any kind submitted. There are two conditions: 1, that the photograph must have been taken by the competitor, and 2, that on the back of each print must be stated exactly what the photograph represents. A fancy title may be added if desired, but entries on which the conditions stated above are not observed will be disqualified.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16, and all entries must be clearly marked with the section letter. They should be addressed: "April Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13." There will be separate sections for Overseas readers, and in each section prizes of 15/- and 7/6 will be awarded. Closing dates: Home Section, 30th April; Overseas Section, 31st October.

Fireside Fun

Policeman: "What's wrong, sonny?"
 Tearful Small Boy: "Please, have you seen a lady without a small boy who looks like me?"



"I've had egg for breakfast."
 "So have I!"
 "Was yours in a shell, out of a hen?"
 "No! In lumps out of a packet!"

Teacher: "What is a cannibal, Percy?"
 Percy: "Don't know, Miss."
 Teacher: "Well, what would you be if you ate your father and mother?"
 Percy (brightly): "Please, Miss, an orphan."

Hunter: "There, charging down on me was a fierce lion."

Listener: "What did you do then?"
 Hunter: "Oh, I just beat it up."
 Listener: "What, the lion?"
 Hunter: "No, a tree."

"I'm a crooner in a dance band," said a customer to a chemist. "Can you recommend something for my throat?"

"Yes," replied the chemist eagerly. "A razor."

"Why have you asked only one of the Smith twins to come to your party?"
 "There's no need for both. They're exactly alike."



"You're wasting your time, my good fellow. I haven't even got a postage stamp on me."
 "I've a good mind to beat yer up! Letting me follow yer all this way!"

BRAIN TEASERS

CAN YOU HANDLE THIS?

If the large hand of Big Ben weighs $1\frac{1}{2}$ tons and the small hand $\frac{1}{4}$ of a ton, what is the total weight of the hands?

* * * *

SOMETHING TO FIGURE OUT

Here are the names of eight famous war leaders disguised by substituting numbers for the letters:
 14 11 14 41; 14 26 56 14 41 23 44 68 14 53; 59
 14 11 11 14 53; 56 59 2 35 26 41; 5 14 65 26 41;
 8 23 62 53 8 23 26 35 35; 53 44 44 56 14 65 14
 35 59; 38 44 41 59 20 44 38 14 53 74.

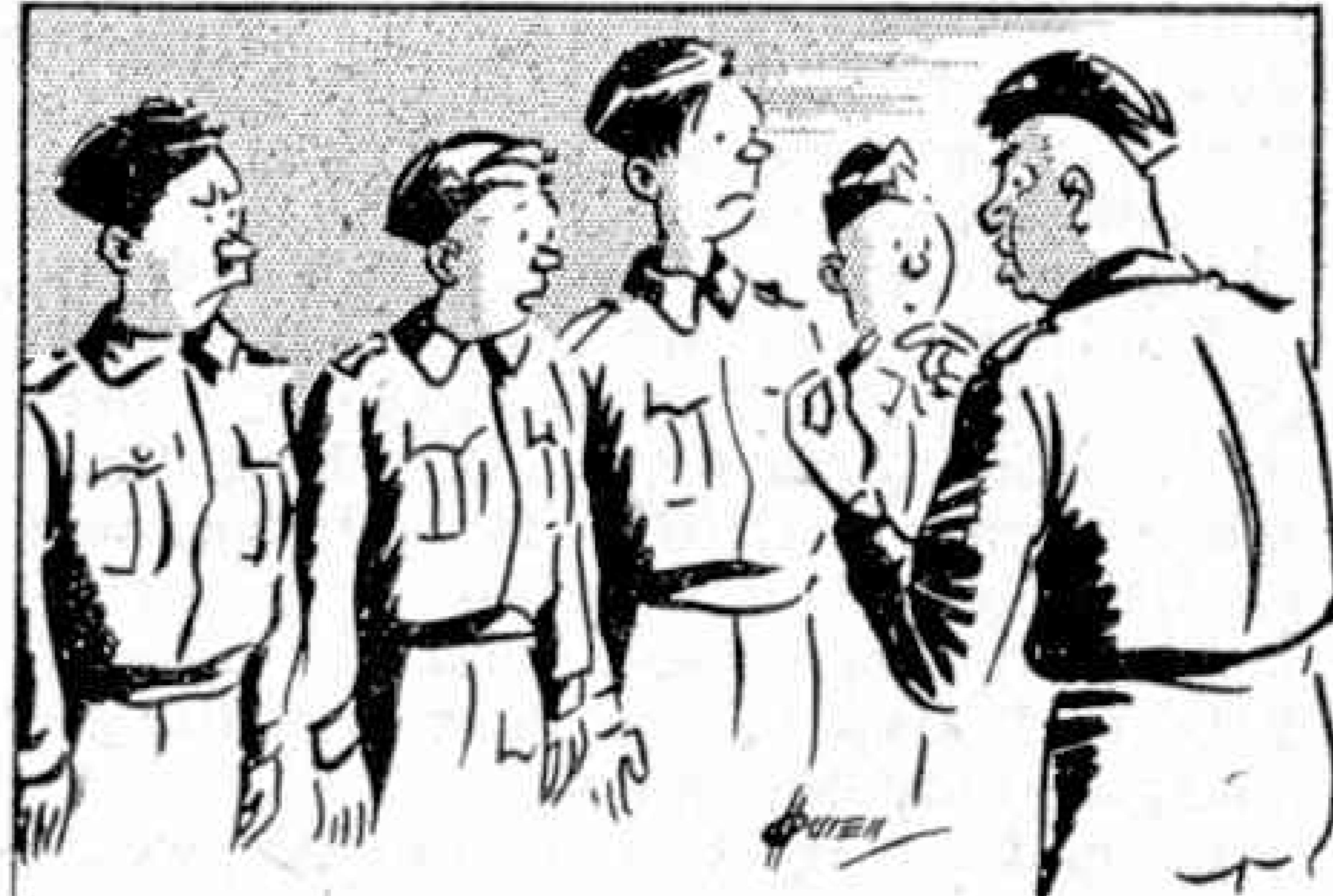
The numbers are in accordance with a plan, and as a hint it may be pointed out that repetitions of letters in certain names provide helpful clues.

* * * *

A PURSUIT RACE

James and John were racing each other on their bicycles on a circular road. When James first passed the starting point again John was 30 yds. behind him. The road was 300 yds. long. How many times did James go round before he caught John up?

T.K.C.



"Remember, this new bullet will penetrate two feet of solid wood, so keep your blinking heads down."

MIXING THINGS UP

The following names may not convey anything to readers at first glance: EVINOK; ELSEE; LARCK; FARRES; DRAXEENAL; LAUGELED; KOSHIMOTEN; DROOWAH. Actually they are those of famous fighting men thoroughly mixed up. Who are the men?

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

I suppose that every reader solved the queer addition sum in our first puzzle. A leathermaker is obviously a tanner, or 6d., the Sun, Moon and stars are three farthings, or $\frac{3}{4}$ d. The weight of a pendulum is a bob, or 1/-, the head of a state is a sovereign, or £1 and he wears a crown, value 5/-.

In our second puzzle the ladder, the wall and the ground make up a right-angled triangle and, as every schoolboy knows, the square of the longest side of such a triangle is equal to the sum of the squares on the other sides. A little manipulation soon shows that the ladder is 26 ft.

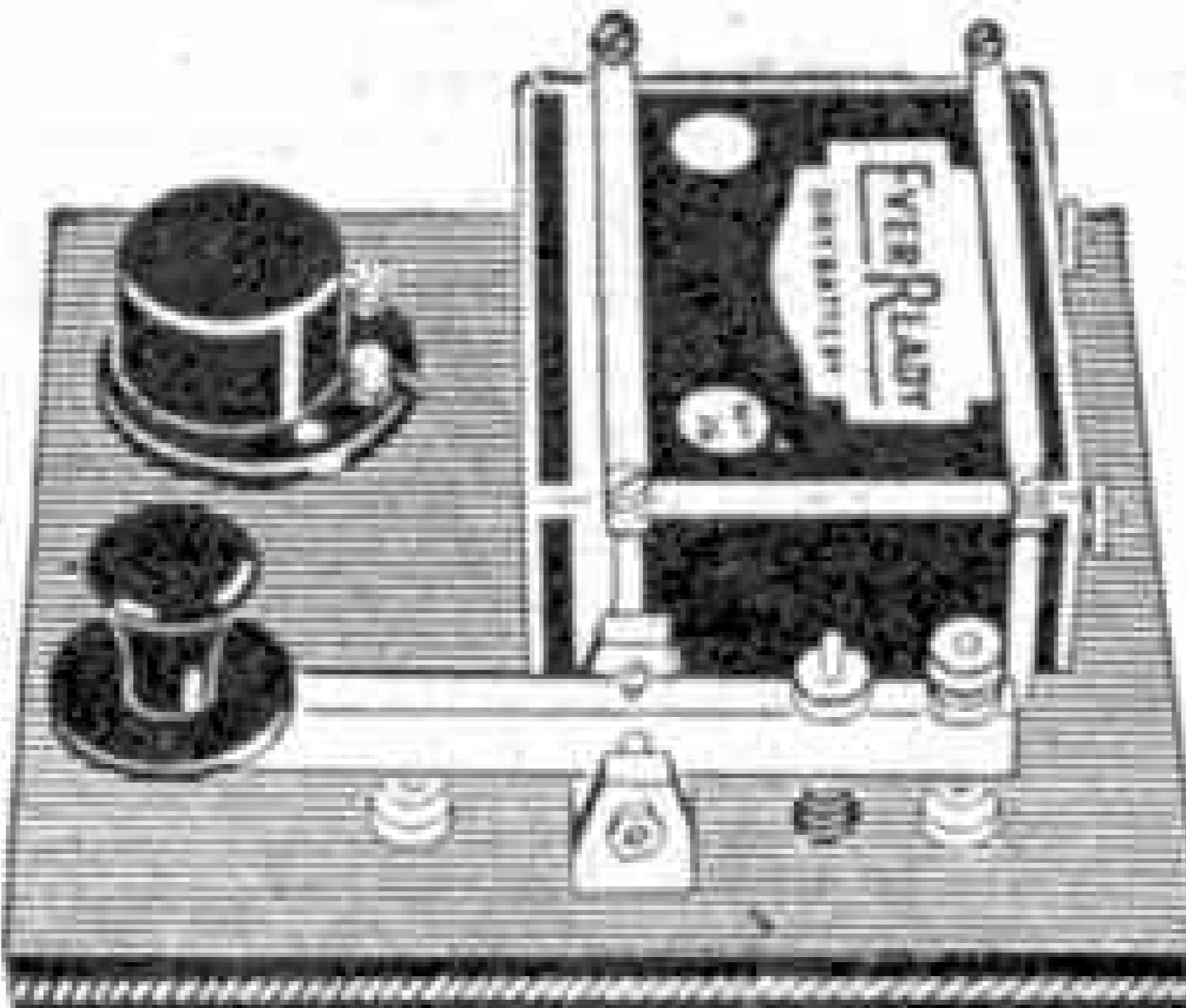
Our third puzzle was a catch. In the last minute the man would put as many eggs in the basket as were already there, so it must have been half full at the end of 59 min.

The five words in our last puzzle were post, pots, spot, stop and tops.

THIS MONTH'S HOWLER

A blizzard is the inside of a fowl.

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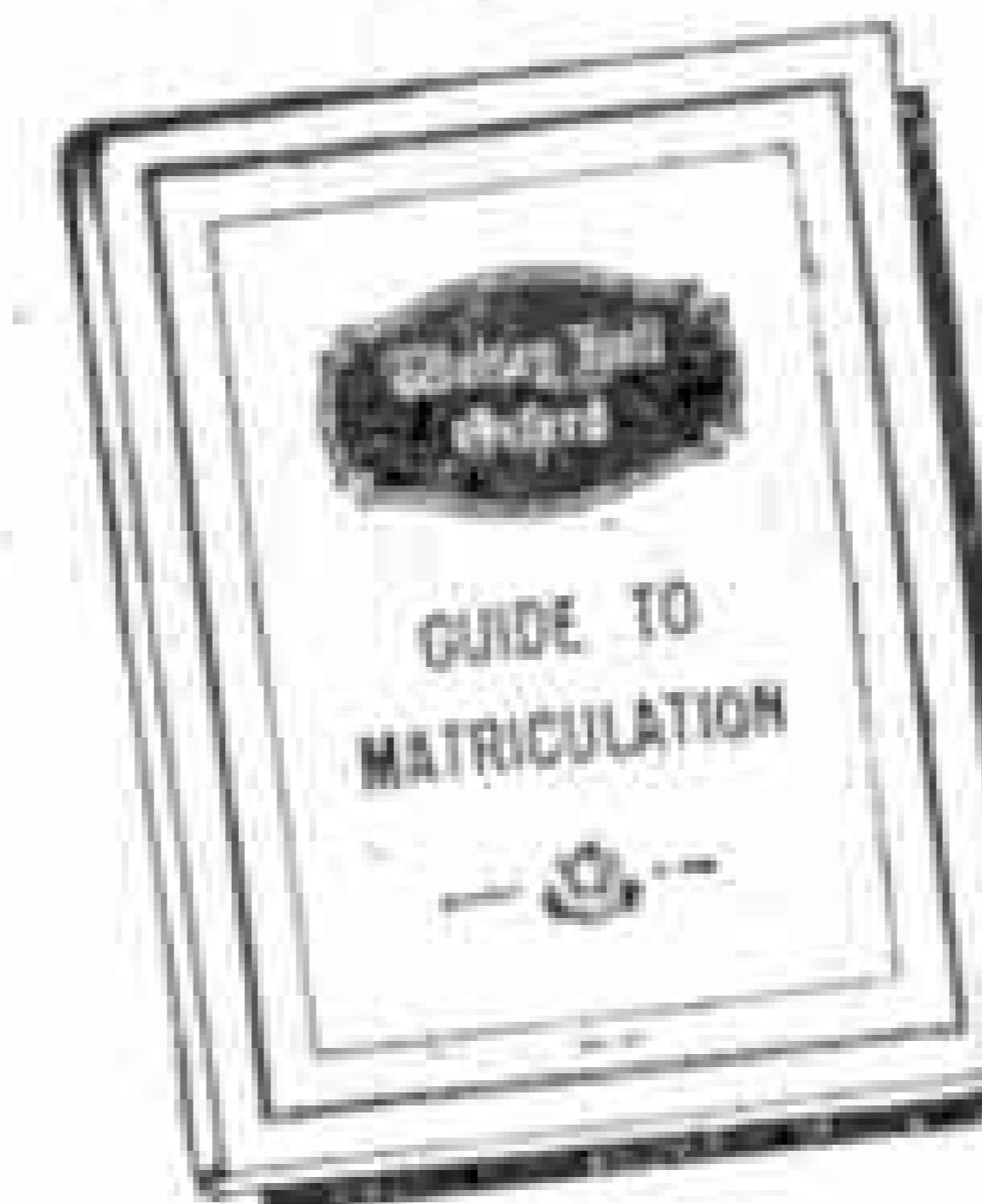
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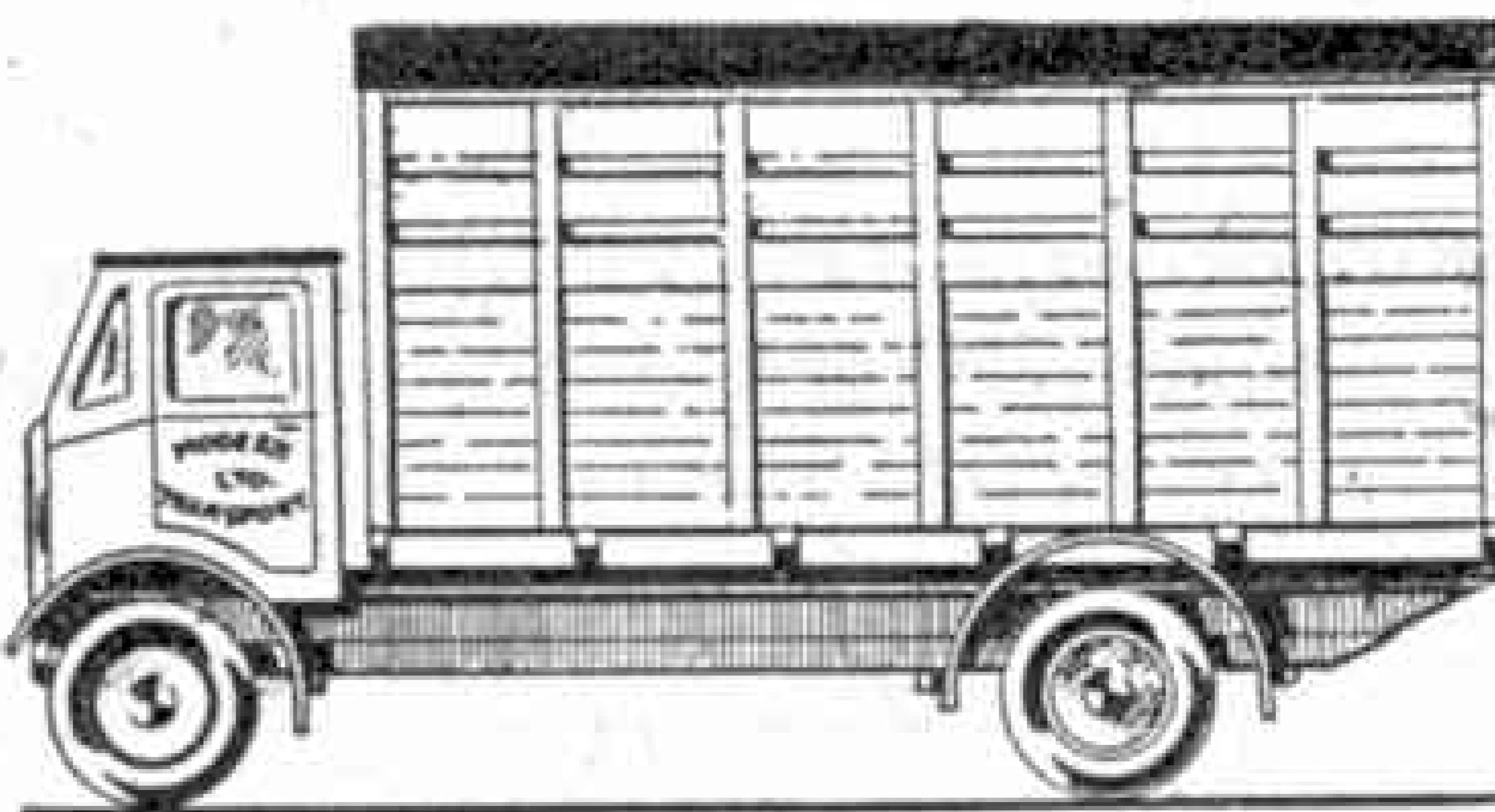
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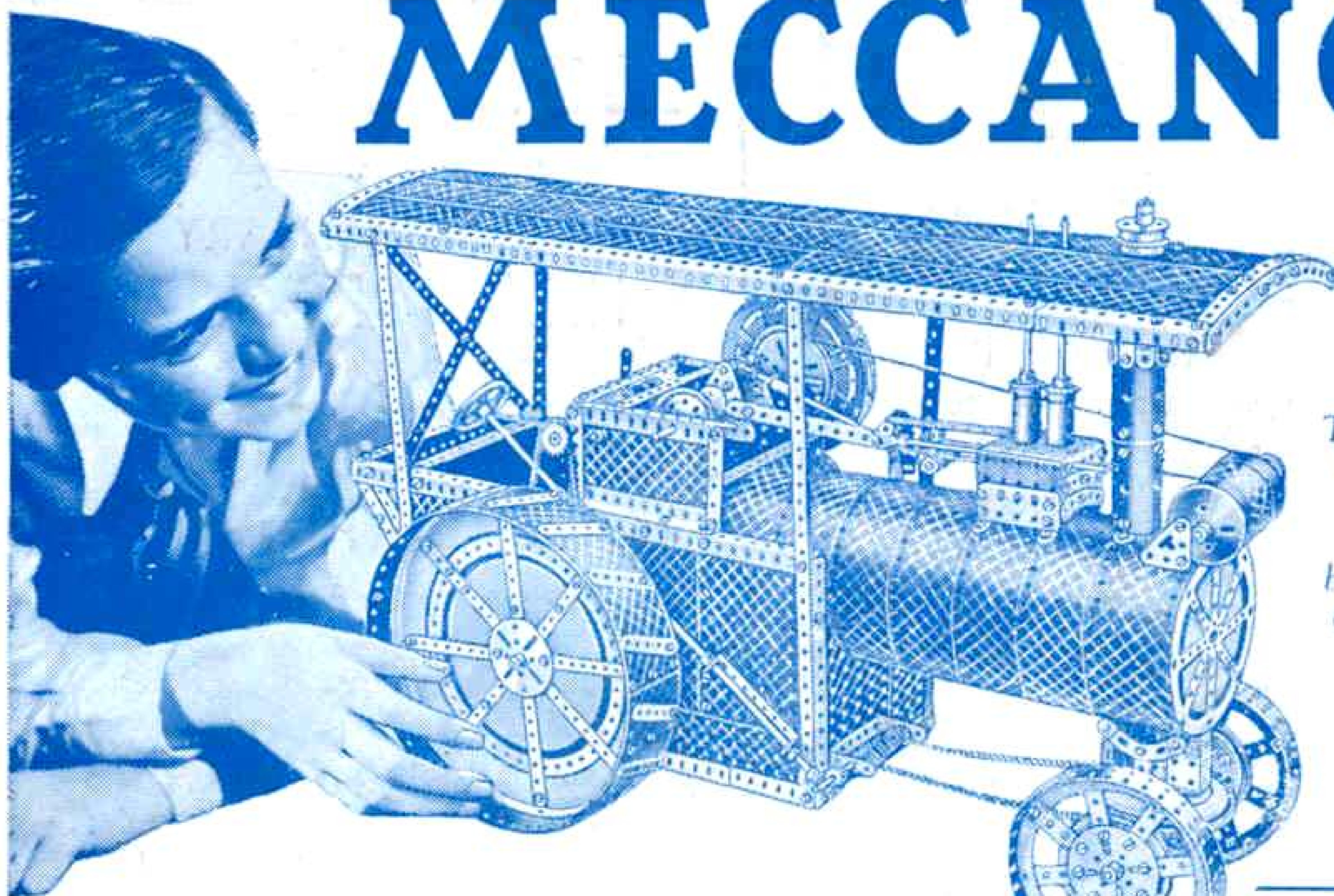
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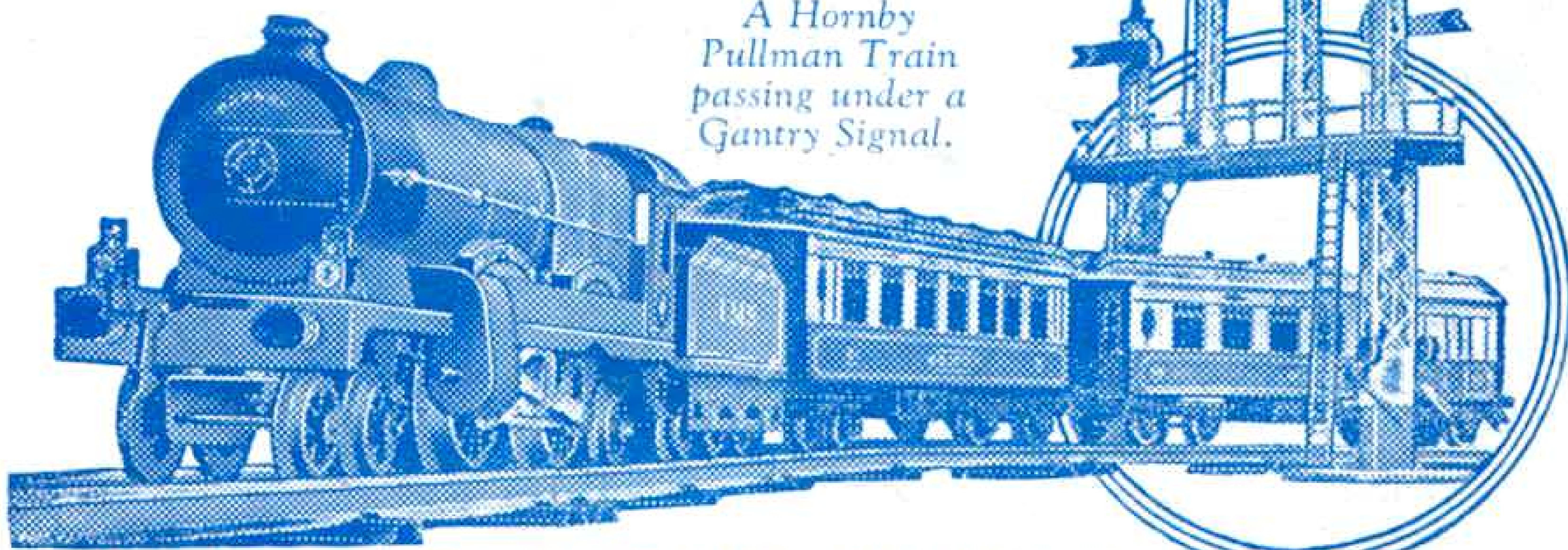


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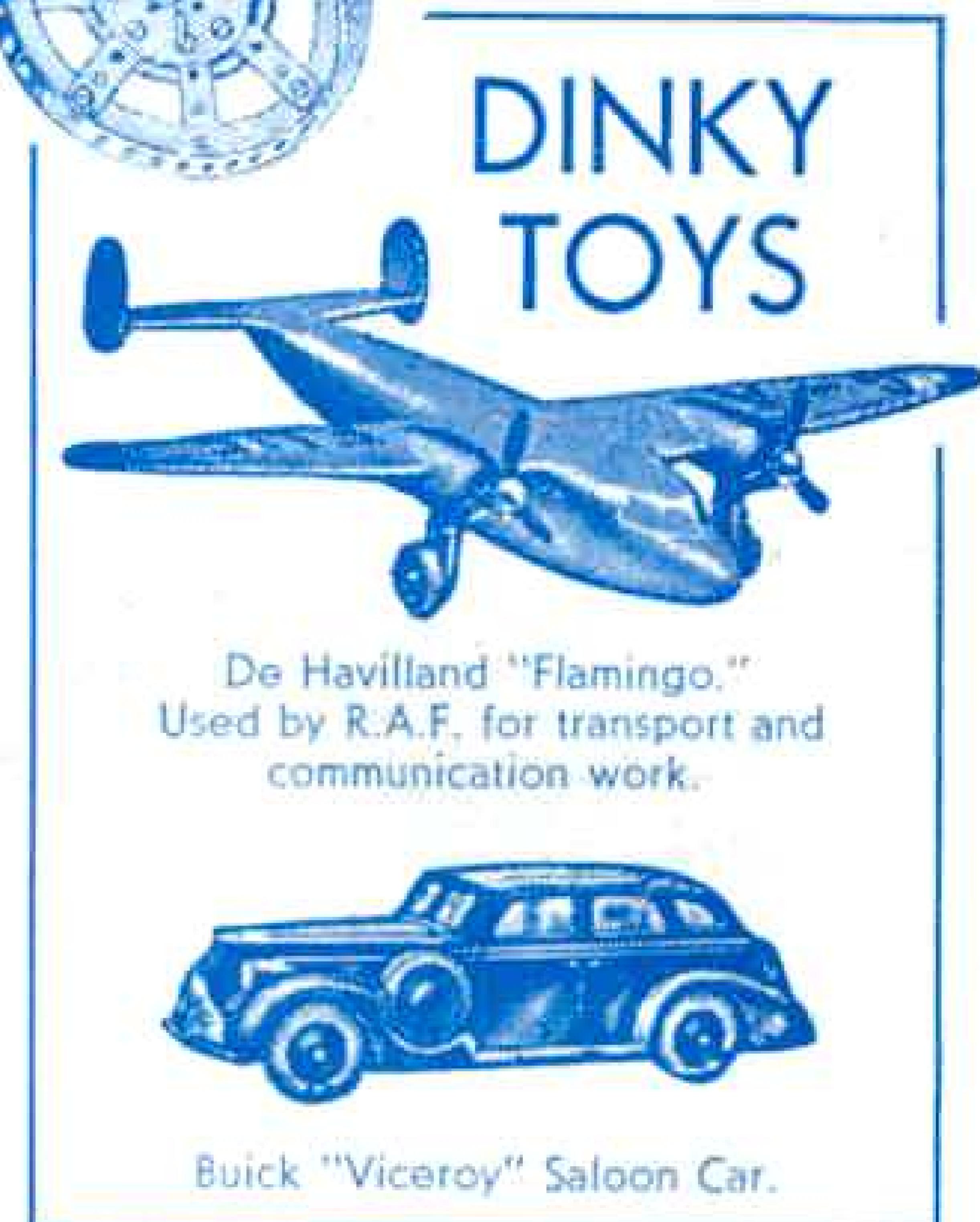
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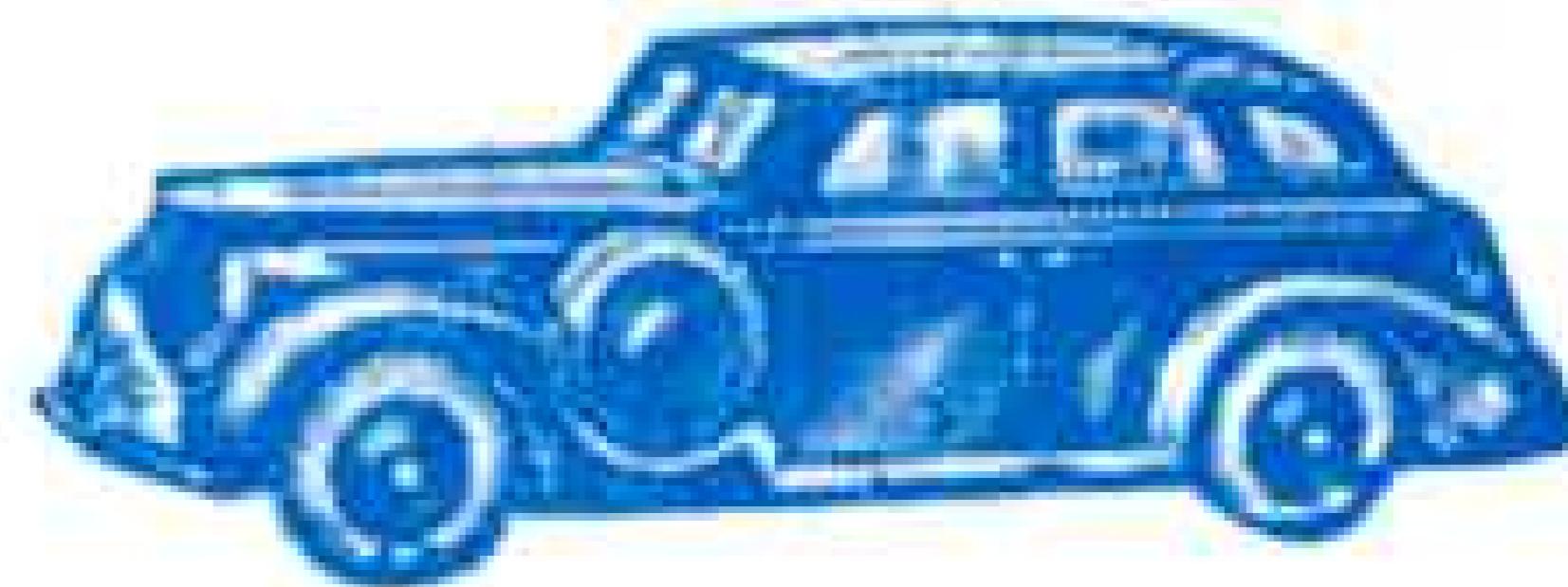
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